

# Week

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profile of seven years' growth.  
atest Census Bureau data fills  
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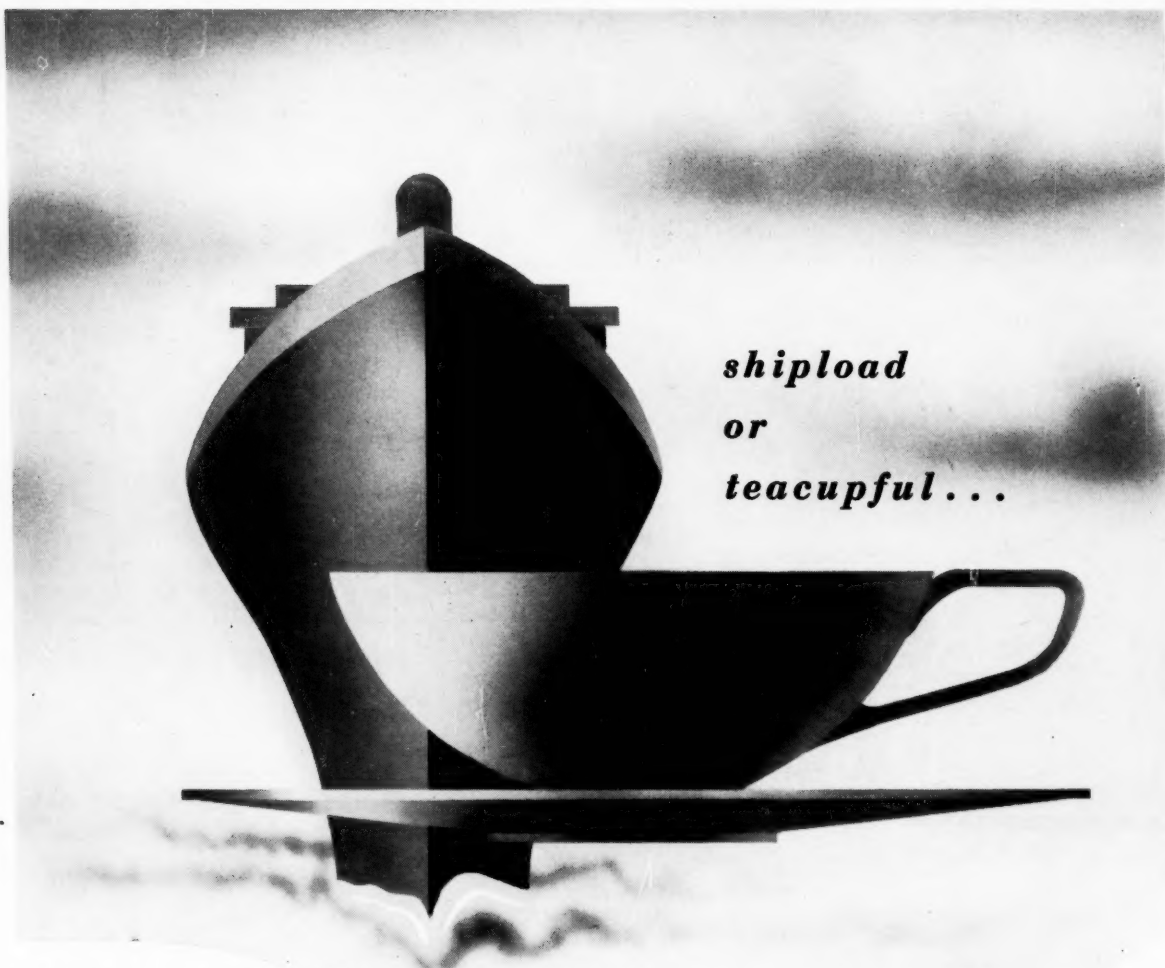
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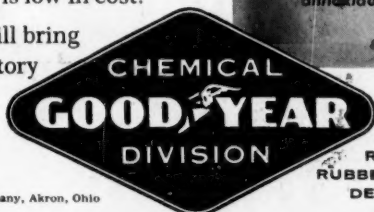
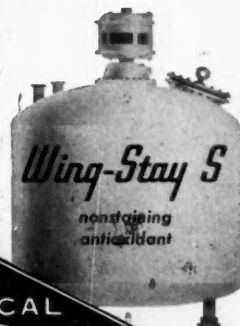


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# Chemical Week

## TOP OF THE WEEK

July 20, 1957

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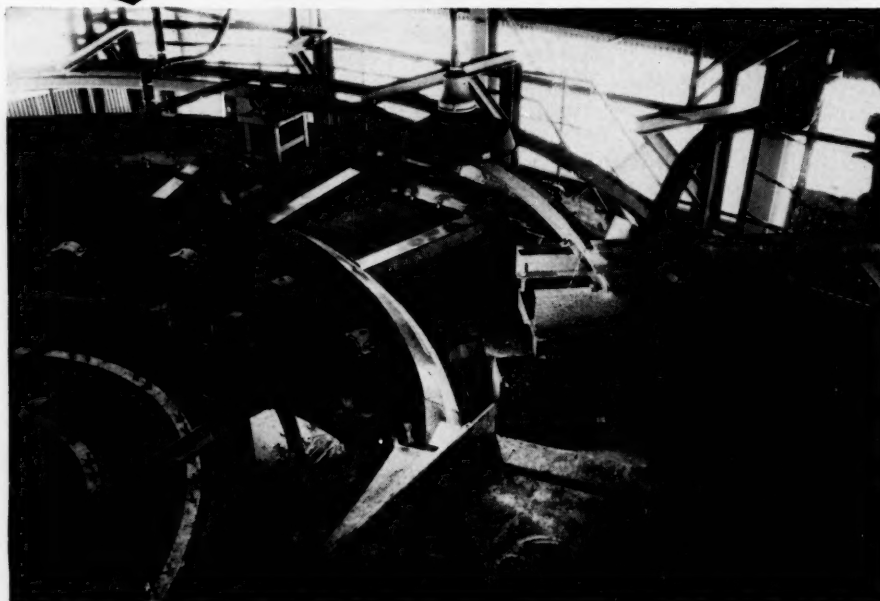
Vol. 80  
No. 3

Chemical Week (including Chemical Specialties and Chemical Industries) is published weekly by McGraw-Hill Publishing Co., Inc., 330 W. 42nd St., New York 36, N.Y. Printed in U.S.A. Second-class mail privileges authorized at Philadelphia, Pa. © Copyright 1957 by McGraw-Hill Publishing Co., Inc. All rights reserved. Subscription: \$3/year in U.S.A., U.S. Possessions and Canada; \$15, other Western Hemisphere countries; \$25, all other countries. Also see p. 25.

Watch CW Grow — 36,057 copies of this issue printed

# U.S.I. CHEMICALS goes on-stream with new "Wet Process" Phosphoric Acid Plant using unmodified "spent" sulfuric acid.

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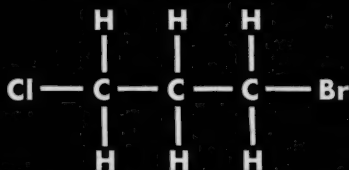
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## ENGINEERING REPORTS:

**BUILT IN 14 MONTHS** by The M. W. Kellogg Co., new ammonia plant is a unit of Standard's Richmond refinery, one of West's largest. All electric equipment is by General Electric, which also provided engineering service to help achieve fast start-up.

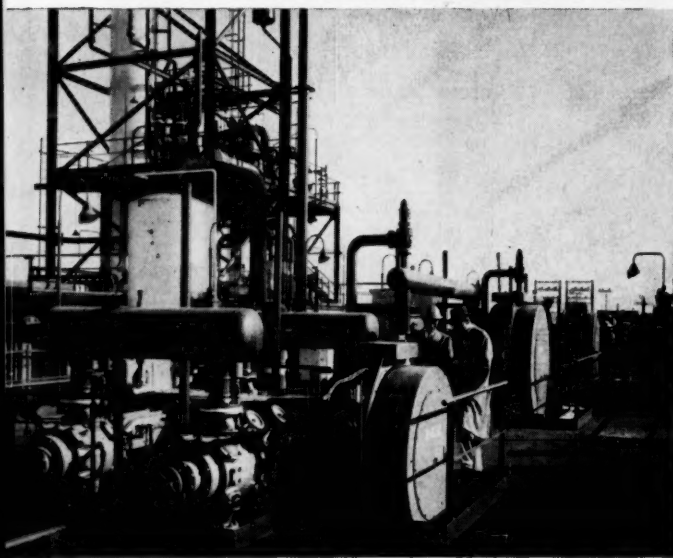
**CO-ORDINATED** for top reliability, G-E equipment in master substation for ammonia

**At Standard's Richmond, Calif., refinery . . .**

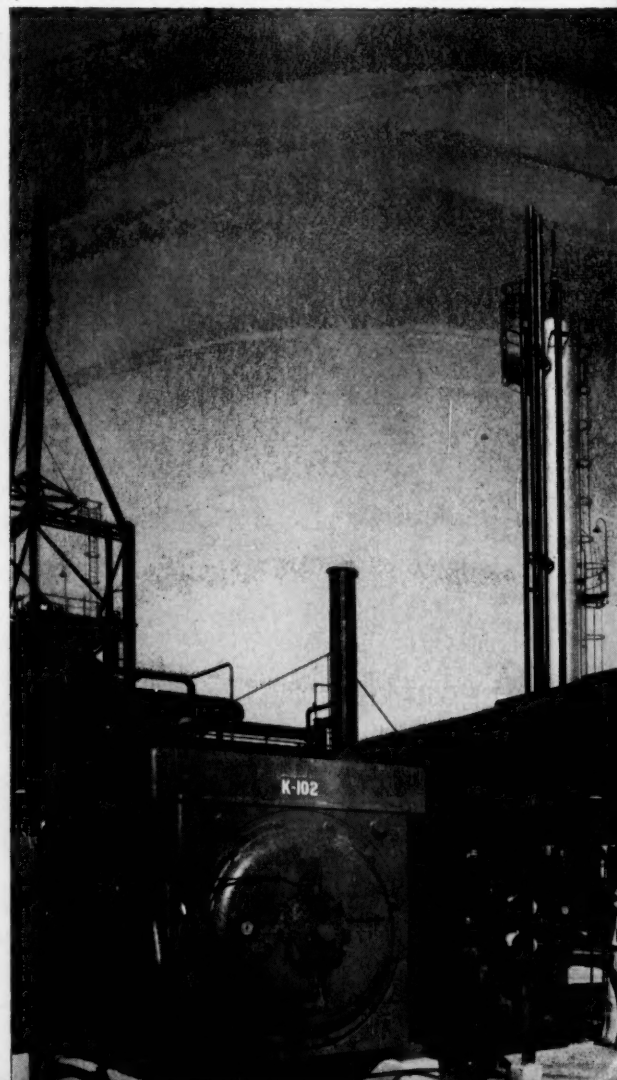
# General Electric engineering services help

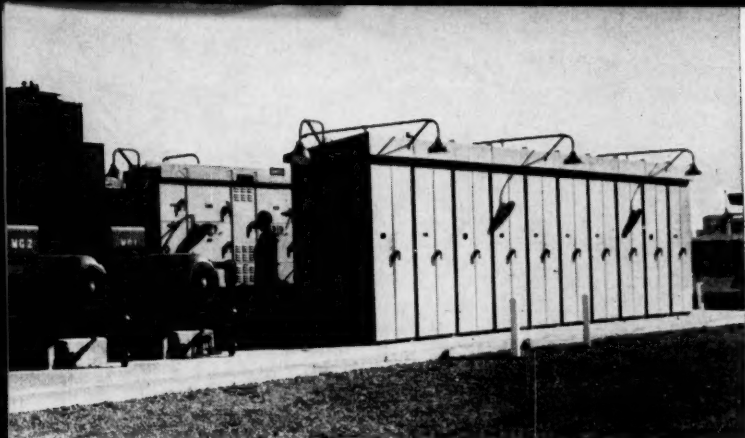
**OUTDOOR-LOCATED** on platform to drive compressors are 8 high-efficiency, enclosed, force-ventilated G-E synchronous motors (3 shown) with excitation obtained from substation's d-c m-g sets.

**PLANT'S BIGGEST**, a 4000-hp 12,000-v totally enclosed force-ventilated G-E induction motor drives synthesis gas compressor. Explosion-proof 60-hp G-E motor (r.) drives blower



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plant includes 5000-kva transformer, 17 units of 12-kv metal-clad switchgear, 2300-v Limitamp\* motor starters, 480-v outdoor motor control centers, 2 outdoor motor-generator sets, and two 480-v transformers.

\*Registered trade-mark of General Electric Co.



**EASY MAINTENANCE** of plant's G-E metal-clad switchgear is shown by workman removing vertical-lift, magne-blast circuit breaker for inspection.

## speed opening of 300-ton/day ammonia plant

drawing clean air—via black ductwork and mushroom tower—from upper level of uncontaminated atmosphere.

**General Electric power system, installed to meet rigid construction schedule, helps plant get fast start on profitable production**

Standard Oil Company of California, Western Operations, Inc., recently added to its Richmond, California refinery—the largest west of the Rockies—a new \$11 million ammonia plant designed, engineered and built by The M. W. Kellogg Co. The plant's capacity of approximately 300 tons per day of anhydrous and aqueous ammonia is shipped to nearby California Spray Chemical Corp., a subsidiary, for conversion into fertilizer.

**GENERAL ELECTRIC** supplied the new plant's electric equipment—compressor drives, auxiliary motors, and complete outdoor substation with co-ordinated components. In addition, General Electric engineering services helped both customer and designer get the new plant from the discussion stage to on-stream in only 14 months.

An example was the contribution of General Electric installation and field service engineers. By supervising the installation of the electric equipment as scheduled deliveries arrived, they helped reduce field installation costs, speed completion of construction schedules, and hasten start-up time. To Standard, this meant getting into production faster, and thereby, showing a return sooner on the large capital investment tied up in the plant.

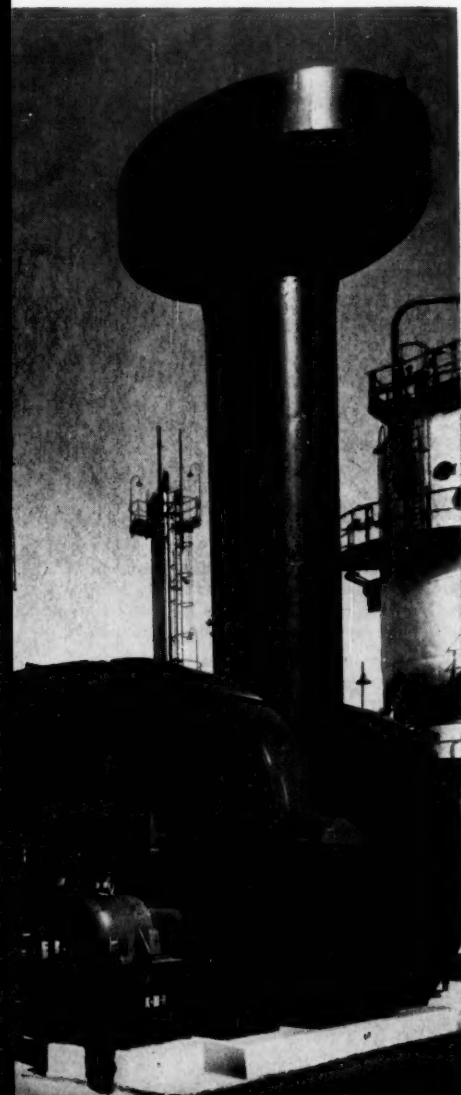
**IN ADDITION**, the 17,000-kva block of power will be integrated into the existing plant system. General Electric application engineering services, working closely with Standard and Kellogg representatives, helped provide the electrical equipment co-ordination and integration necessary to meet the plant's process power requirements.

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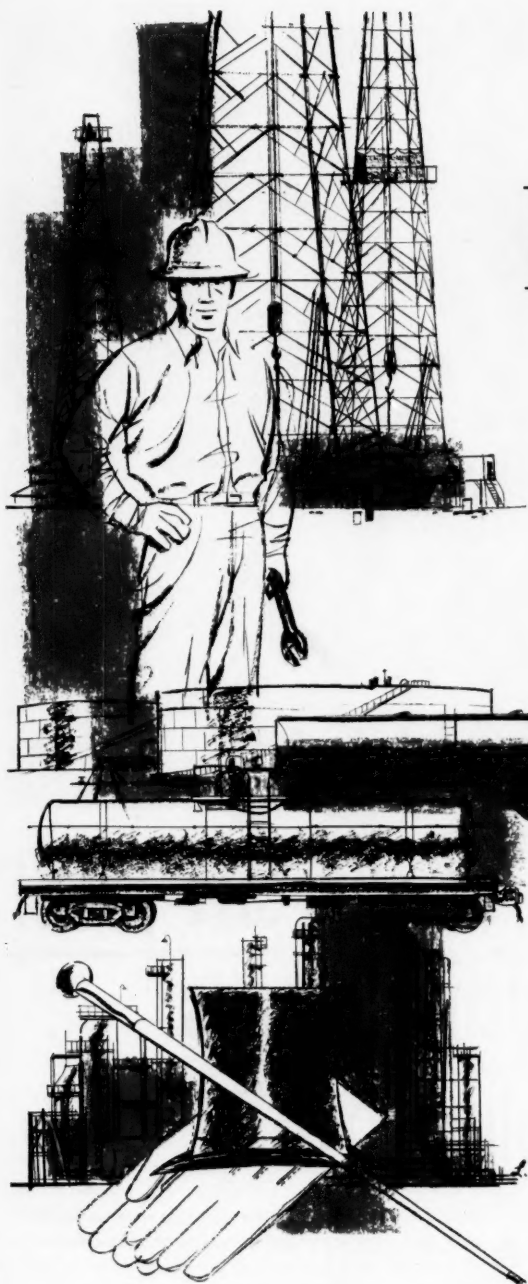
We should have seen it ten years ago. Way back in 1957, almost every economist kept telling us business would expand more than 50% in the next decade—steel was going to be tough to get—normal obsolescence would subtract even more cars and new tank cars couldn't be built overnight. But—we put off doing anything about it. Then it was too late. Maybe your company can benefit from our experience."

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The low cost of Bemistape makes it economically feasible to use pressure-sensitive tape for bag closing. And users report that it saves up to 25 percent as compared with creped tape and latex adhesive, by eliminating start-up and clean-up time and waste.

If you already have a machine for closing with tape over sewing, you probably can easily adapt this machine to use Bemistape. If you haven't a machine already, the new Bemistape Top Closing Machine will be the best-paying investment you can make. Or, if your volume is small, manual rollers do a fine job with Bemistape.

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# Business Newsletter

CHEMICAL WEEK  
July 20, 1957

## **Union Carbide now faces charges of violating antimerger laws.**

Federal Trade Commission lawyers last week filed a formal complaint that the supplier-customer marriage of Carbide and Visking Corp. last December violates the Clayton Act's antimerger provisions. That's the same act by which Du Pont was ordered to dispose of its General Motors holdings.

According to the FTC, the Carbide-Visking combination brought together the nation's largest producer (46% of total U.S. production in 1956) of polyethylene resin (Carbide) and the largest producer (65% of total U.S. production in '56) of polyethylene film (Visking); and in so doing, it substantially lessened competition or tended to create a monopoly in the manufacture and sale of polyethylene resins and film.

## **Carbide has not yet answered the FTC's charges that the merger:**

- forecloses other manufacturers of polyethylene resins from a substantial share of the market,
- puts Carbide in a position to manipulate prices,
- may preclude or limit entry of new competitors into the manufacture and sale of polyethylene film.

The complaint also says that Visking bought 82% of its polyethylene resin requirements from Carbide in 1955, and almost 90%—over \$18 million worth—in '56. And without relating it to the antimerger phase of the case, FTC says Carbide granted Visking discounts on its polyethylene purchases that it gave to no other customers.

## **High-purity silicon will be available soon from a new source,**

a firm jointly owned by W. R. Grace and Pechiney, the giant French chemical firm. The new firm—as yet unnamed—hopes to have its 20,000-lbs./year plant in operation within a year; meantime, it will sell the elemental metal produced by Pechiney in France through International Selling Corp.

Grace's Davison Chemical Division will direct operation of the new firm. Davison is already importing Pechiney's high-purity aluminum for production of reforming catalysts, and has licensed a Pechiney process for urea production.

Location of the new plant has not been set. Requirements for uncontaminated atmosphere rule out some areas; industry word is that Grace is considering Puerto Rico—though the island's salty air could possibly cause production problems.

## **Recent strong bids to unionize chemical centers in Orange, Tex.,**

and the Kanawha Valley of West Virginia have been met with continued strong opposition from management.

## Business

### Newsletter

(Continued)

At Orange, Allied Chemical says it won't negotiate with the Oil, Chemical and Atomic Workers Union until told to do so by the National Labor Relations Board (OCAW has filed its petition). OCAW, which only a month ago was elected to represent workers at the Acheson Dispersed Pigments plant there, says it now represents the majority of Allied's 75 workers. Should Allied be organized, Spencer Chemical (about 160 eligible employees) would likely be the next target for OCAW. Then, expect an all-out drive for Du Pont's 1,300.

Plant managers in Union Carbide's and Du Pont's nonunion plants in the Kanawha Valley have received letters from Cecil Martin, district director of OCAW, urging wage boosts. The letters seem to be part of the direct mail campaign the union is using while it readies big organizational drives at Carbide's South Charleston plants and Du Pont's Belle Works.

The OCAW says it already has enough members in craft unions at Carbide's Institute plant to ask that the NLRB conduct an election; it's seeking as many extra members as possible before it petitions for an election. And the AFL-CIO building-trades unit is setting up a council to do the bargaining for construction workers at Carbide's Institute and Charleston plants.

•  
**Lowered earnings mar the half-year financial records** of two early reporting chemical producers.

- Allied reports total sales of \$183.6 million for the second quarter of '57 (six months sales: \$349.5 million), up 5% over the comparable period of last year. Net, however, fell to \$12.1 million, from '56 first-quarter net of \$12.8 million, and per-share earnings dipped to \$1.22 from \$1.29. For '57, six-months total earnings were \$22.1 million (\$2.23/share), compared to \$25.5 million (\$2.57/share) in '56.

- Hercules shows a greater net in '57, but its per-share earnings fell somewhat: Net sales and operating revenue in '57 were \$124.8 million, with earnings of \$1.03/share common; in '56, net was \$120.4 million, but earnings were \$1.18/share.

•  
**American Cyanamid plans to take over Norwich Pharmacal Co.**  
The plan, approved by directors (but still to be voted on by stockholders), would make Norwich a division of American Cyanamid by exchange of three shares of Cyanamid stock for four Norwich shares.

•  
**Du Pont is giving an extra dividend to employees** buying U. S. bonds. Last week it added a full share of Du Pont stock to the savings of each of 15,000 employees in its thrift plan—and another 20,000 employees will get their stock within two months. In the voluntary plan, employees sign up to invest (by payroll deduction) a certain amount of money each month in U. S. Series E Savings Bonds. And each month, the company adds a sum equal to one-quarter the amount saved to a fund that finances the purchase of Du Pont stock on the open market.

# BRIEFS

## for buyers of

## Caustic Potash Sodium Sulfides Inert Lubricants Sodium Chlorate

### Facts on caustic potash

While there are a few growing uses for dry forms of caustic potash (notably the powder and flake), about 8.5 out of every 10 pounds of KOH purchased in the U.S. are bought as liquid, either standard or low chloride grade.

Reasons for this are pretty clear: liquid KOH is easier to handle than solid forms, and cheaper to buy (particularly in the higher concentrations).

Shipping strength of liquid KOH is limited, by its penchant for crystallizing in cool weather, to a narrow range between 45% and 52%. Big-volume users sometimes order 52% to keep freight cost down; this is about the practical limit on strength.

NIALK® liquid caustic potash is regularly shipped at 45% to 52% concentration. It is extremely low in iron content.

If your process economics favor a solid form of KOH, you can get a wide choice by specifying NIALK brand. We ship 90% caustic potash as fused solid, flake, granular, walnut, broken, powder, or crushed. ("Walnut" is used in liquefying air; flake and powder often go into cleaning compounds, mixed with caustic soda, soda ash, metasilicates, and phosphates.) We also supply 85% KOH in flake or solid form.

KOH is a "specialty" alkali. You buy it for specific properties you just can't get from other alkalis. Making it takes special skills, too.

You can have confidence in the same skill that pioneered caustic potash on this continent and has supplied NIALK KOH for half a century. We continue to supply a major portion of the total requirements of this country.

### Can you pass this sulfide quiz?

Here's a quick way to tell if you're getting good value in the sodium sulfide and sodium sulfhydrate you buy:

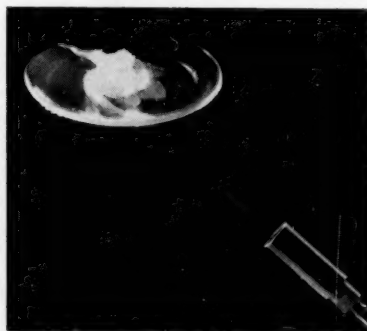
1. Do you always receive sulfide or sulfhydrate in brand-new drums?
2. Is every drum lacquer-lined to prevent iron contamination?
3. Is iron content consistently lower than 10 ppm?
4. Are drum lids sealed so they can't pop open in handling or storage?
5. Can drums be resealed easily?

If you have to say "no" to any of these questions, you're probably risking some contamination in your process. To some, this is a serious matter.

Even if it isn't serious, why put up with it at all—when you can get sodium sulfide or sulfhydrate that's virtually

iron-free, protected by all the safeguards mentioned above?

To do so, simply write *Hooker* on your next purchase order for either of these products. Why not order a trial quantity now?



### You can't burn this grease

You may at first be discouraged at the things you *can't* do to this product. But therein lies its value.

Besides being completely nonflammable, it won't break down in the presence of oxygen, hydrogen peroxide, concentrated mineral acids and alkalis. It's unaffected by heat up to 300° C; is stable at very low temperatures, too; is odorless and nontoxic.

What's its name? FLUOROLUBE®. It's a high-density addition polymer of trifluorovinyl chloride. The basic polymer can be fractionated into many grades, ranging from low-viscosity colorless oils through heavy oils to opaque greases. All have excellent lubricating qualities.

Fluorine and chlorine, accounting for nearly 80% of the molecule, contribute to the high densities and complete fire safety of FLUOROLUBES.

What *can* you do with them? Some suggestions: lubricate ultraprecision instruments; seal pumps, valves, pipe joints in equipment handling oxygen, hydrogen peroxide, nitric acid, and other corrosives; lubricate PVC fittings, plug cocks, vacuum pumps in highly corrosive service.

You'll find other ideas on use, plus specifications and typical properties, in a data file on FLUOROLUBES which you can get by checking the coupon.

### More NaClO<sub>3</sub> coming

Thanks to our OLDBURY® Products plants at Niagara Falls, N. Y., and Columbus, Miss., we're presently the nation's largest producer of sodium chlorate. But even that isn't good enough to meet *tomorrow's* needs.

The Columbus plant has been in production since 1954. Last summer we upped its capacity by 5,000 tons per year. Now we're building again. By early 1958, another 5,000 tons yearly will be on tap.

Assuming you're in the market for sodium chlorate, may we submit these three reasons for making Hooker your supplier:

1. Fastest service you can get east of the Rockies.
2. Skilled technical help when you need it.
3. Sodium chlorate of 99.5% minimum purity.

May we spell out these advantages for you in more detail? If so, just write to *Hooker Electrochemical Company* at the address given below.

For more information on chemicals mentioned on this page, check here:

- |   |  |
|---|--|
| <input type="checkbox"/> Caustic Potash     | <input type="checkbox"/> FLUOROLUBES                         |
| <input type="checkbox"/> Sodium Sulfide     | <input type="checkbox"/> Sodium Chlorate                     |
| <input type="checkbox"/> Sodium Sulfhydrate | <input type="checkbox"/> New list of products—Bulletin 100-A |

Clip and mail to us with your name, title, and company address.  
(When requesting samples, please use business letterhead.)

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# Vogt

Rugged Vogt Drop Forged Steel Gauge Cocks on this Natural Gasoline Storage Tank at Warren Petroleum Corporation's San Pedro California Terminal, are unsurpassed for safety to contents and to plant personnel. If a gauge cock glass should be accidentally broken, balls in the gauge cocks would automatically shut off the liquid until repairs were made.

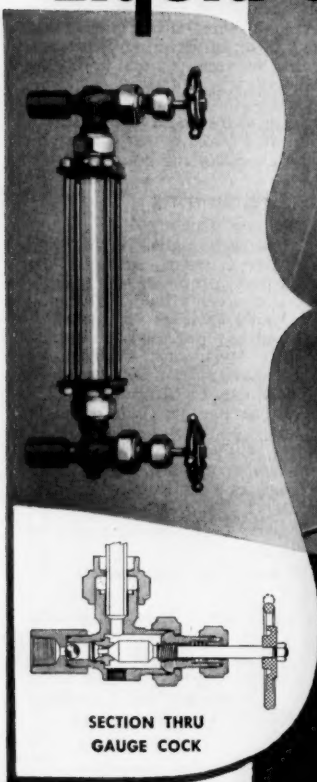
Reliable, trouble-free, outdoor operation year after year in exacting services of this kind is yours when you install Vogt Drop Forged Steel Liquid Level Gauges.

**HENRY VOGT MACHINE CO., P. O. BOX 1918, LOUISVILLE 1, KY.**

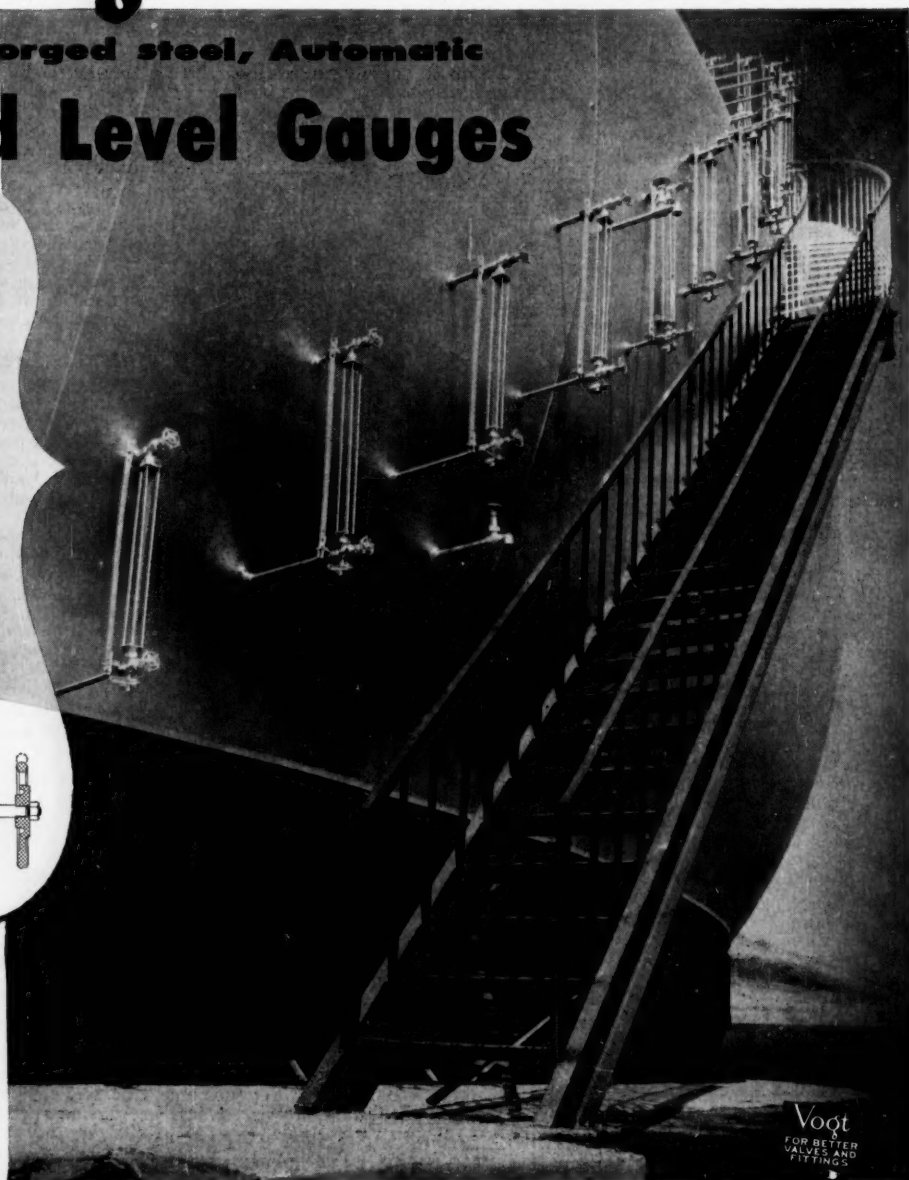
SALES OFFICES: New York, Chicago, Cleveland, Dallas, Philadelphia,  
St. Louis, Charleston, W. Va., Cincinnati.

**Drop forged steel, Automatic**

## Liquid Level Gauges



See Catalog F-9 for complete data on gauge cocks, trims, and gauge glasses for specific operating conditions or write Dept. 24 A-FCW.



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VALVES AND  
FITTINGS



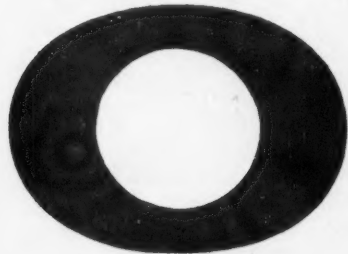


# Oxygen doesn't always mean "life"

## Eastman antioxidants are extending the useful life of products in many fields

Many products need protection against oxygen.

Lard, a typical example, turns rancid at room temperatures unless protected by the addition of an antioxidant. "Returns" and complaints of off-flavor and rancidity have long been the bane of vendors of shelled nuts. Today, thanks to the availability of an Eastman antioxidant, nut



processors can practically eliminate such complaints and greatly expand their product's distribution. The longer shelf life made possible by Eastman antioxidants, has likewise helped potato chip manufacturers broaden their selling area.

Eastman antioxidants have also helped to develop a new outlet for inedible fats and oils... animal feeds. Added to feed in amounts up to 4% to 5%, these fats improve the feed and represent a market of 200-300 million pounds annually. This was a totally new market for fats and helped ease a fat-surplus problem for the meat industry. Yet, it would have been impossible if antioxidants had not been available to stabilize the fat and keep the feeds fresh and palatable.

Eastman antioxidants protect many different food products, but an even broader field is covered by their use in industrial products.

In gasoline and motor fuels, antioxidants made by Eastman protect against the formation of power-robbing gum.

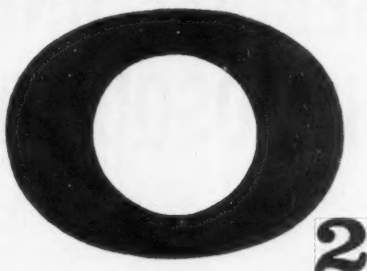
In transformer and turbine oils,

Eastman antioxidants extend service life by preventing the quick breakdown that might otherwise occur at the high working temperatures encountered.

In plastics, Eastman antioxidants help stabilize plasticizers for vinyl resins and are also used to protect polyethylene against deterioration during molding and extrusion and upon extended exposure.

In rubber, antioxidants play a well-known role in protecting against aging and heat deterioration. Rubber also needs protection against ozone—one of the most powerful oxidizing agents known. Even the minute concentration of ozone in the atmosphere can severely damage rubber products. To combat this attack, Eastman antioxidants are available.

In the agricultural field Eastman antioxidants are extending the effectiveness of such important pesticides

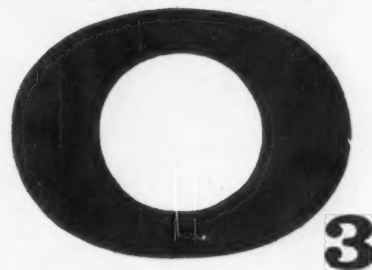


as pyrethrum. In poultry feeds other Eastman antioxidants are widely used to bring more chicks to faster and more profitable maturity by protecting vitamin content, stimulating growth, improving pigmentation, in-

creasing the utilization of Vitamin A from carotene and safeguarding chicks against such deficiency diseases as encephalomalacia.

This list could be continued to show that whenever oxygen poses a destructive threat to organic compounds there is a good chance that an Eastman antioxidant is available for effective counter measure.

Perhaps one of the many antioxidants made by Eastman could help you add life to some product you



make or use. Perhaps, as the foregoing examples illustrate, one of these antioxidants could help you combat rancidity, bad odor, off-flavor, loss of nutrient value, discoloration, embrittlement or aging.

Eastman antioxidants have helped many companies extend present markets and even develop new markets. If your product—be it food, agricultural or industrial—needs protection against oxidative deterioration, call in Eastman. Eastman's food and industrial antioxidant laboratories are staffed with specialists anxious to help you explore the benefits, the use, and the cost of antioxidants.

For more information, write to EASTMAN CHEMICAL PRODUCTS, INC., a subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE.

### Products in these fields know the value of Eastman antioxidants

FOOD	INSECTICIDES
RUBBER	ANIMAL FEEDS
PLASTICS	HYDRAULIC FLUIDS
PETROLEUM	TRANSFORMER OILS
VEGETABLE and ANIMAL OILS	

## Eastman ANTIOXIDANTS

to combat oxidative deterioration

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; New York City; Framingham, Mass.; Cincinnati; Cleveland; Chicago; St. Louis; Houston. West Coast: Wilson Meyer Co., San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.



**CONVINCING EVIDENCE**—A swarm of mosquitoes in this test glass enclosure show no interest in the man's arm above the black line where meta Delphene repellent has been applied, although they feast on his untreated wrist and hand. (USDA Photo)

## HOW TO BECOME UNPOPULAR WITH MOSQUITOES

A new and outstanding insect repellent—diethyl-meta-toluamide—developed by the United States Department of Agriculture for the Armed Services, is available in increasing commercial quantities from Hercules Powder Company under the name of meta Delphene.

USDA workers have found the meta isomer of diethyl toluamide to be the most effective repellent of the three isomers tested.

Hercules' background in xylene chemistry, coupled with its understanding of the rigid quality control procedures involved, has made possible the manufacture of a product with unusually high meta content. Meta Delphene (83% minimum meta isomer) is available

only in a purified grade suitable for a cosmetic chemical.

This new repellent is highly effective against mosquitoes, chiggers, ticks, fleas, and biting flies. Meta Delphene offers many more characteristics ideal for manufacturers of repellents.

For example, it is odorless and does not rub off easily, providing longer protection than other repellents. It can also be applied directly to most fabrics and can be incorporated in dry-cleaning agents to furnish protection against insects.

Reports from the USDA, after two years of extensive tests, indicate that this new chemical will provide the best protection available against a wide variety of insects.

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HERCULES TRADEMARK  
83 per cent minimum meta isomer

Agricultural Chemicals Division, Naval Stores Department  
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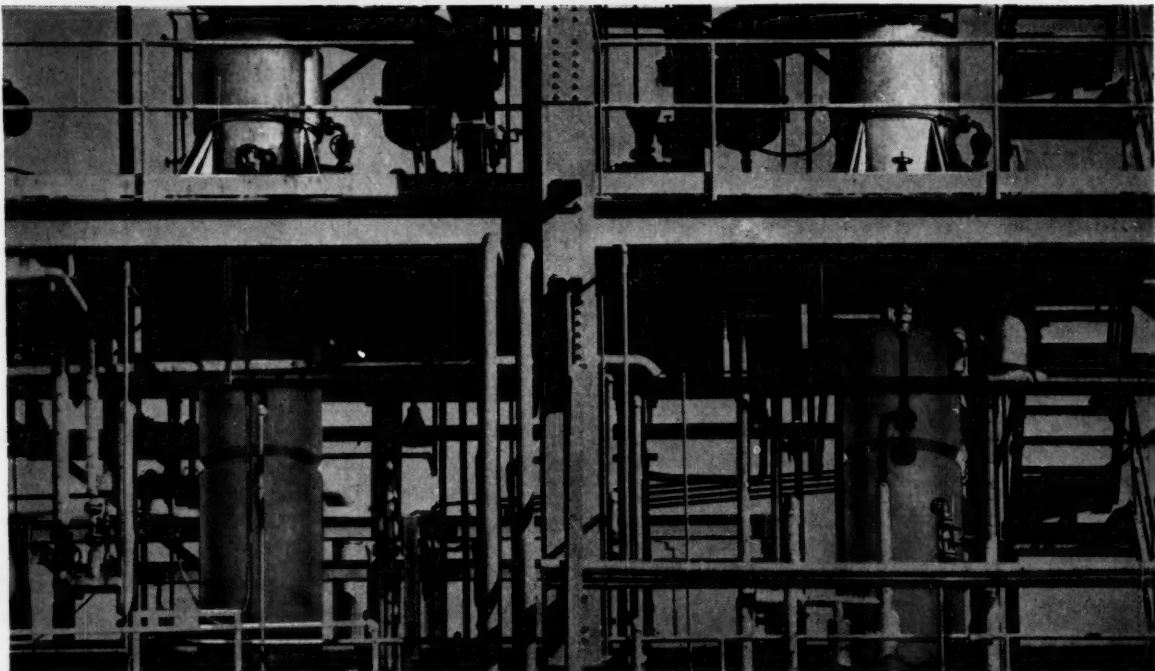
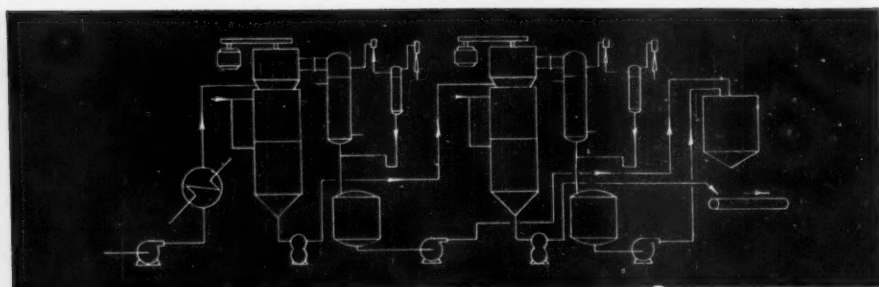
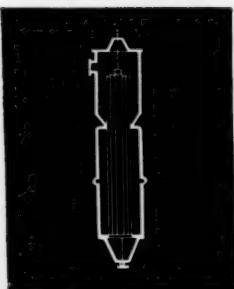
- J&L specialists, backed up by modern research, are ready to consult on your toughest packaging problems.
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Call your nearest J&L Container Division office for recommendations on your packaging problems. Or write direct to the Container Division, 405 Lexington Avenue, New York 17, N. Y.



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Turba-Film Processor ideal for this application. The Turba-Film permits a high degree of solvent removal with greater through-put than conventional equipment. Solvent and carrier pass through two Turba-Film units as a thin, falling film. Localized overheating is eliminated and product color is greatly improved.

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JULY 20, 1957

VOL. 80, NO. 29

Chemical Week (including Chemical Specialties and Chemical Industries) is published weekly by McGraw-Hill Publishing Co., Inc., James H. McGraw (1860-1948), founder. **Executive, Editorial, Circulation and Advertising offices:** McGraw-Hill Building, 330 West 42nd St., New York 36, N. Y. Publication office: 1309 Noble St., Philadelphia 23, Pa. See panel below for directions regarding subscriptions or change of address. Donald C. McGraw, President; L. Keith Goodrich, Vice-President and Treasurer; John J. Cooke, Secretary; Nelson Bond, Executive Vice-President, Publications Division; Ralph B. Smith, Vice-President and Editorial Director; Joseph H. Allen, Vice-President and Director of Advertising Sales; A. B. Venezian, Vice-President and Circulation Coordinator. Subscriptions to Chemical Week are solicited from management men in the chemical process industries. Position and company connection must be indicated on subscription order. Send to address shown in panel below. United States, United States Possessions and Canadian subscription rate for individuals in the field of the publication, \$5 per year; single copies, 35¢. Foreign subscription rates per year: Western Hemisphere countries, \$15; all others, \$25, payable in advance. Second-class mail privileges authorized at Philadelphia, Pa. Printed in U.S.A. Title registered in U.S. Patent Office. © Copyright 1957 by McGraw-Hill Publishing Co., Inc. All rights reserved.

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**Chemistry of Acrylamide**

New developments are reported in the periodically issued house organ,

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## OPINION

### Dutch Cooperation

TO THE EDITOR: [Re] . . . the article on the chemical industry in the Netherlands (May 25).

I would like to compliment you on the way in which, in such short space, you created an interesting article on the subject, which I believe will be of interest to chemical companies in the U. S.

I particularly appreciated the emphasis you placed on the Netherlands' positive and cooperative attitude toward foreign industry and the importance the emerging common market will have as a free-trade area for a profitable development of American subsidiaries operating in those markets. . . .

JOSEPH P. BOURDREZ  
General Manager  
Netherlands Industrial Institute  
New York

### Alabama Lures

TO THE EDITOR: This is in regard to the article entitled "The New Look in Southern Hospitality" (June 22).

In the table of inducements accompanying the article, Alabama was not checked under the category "access roads and other improvements". Our communities have for some time been performing this type of service for new industries and shall continue to do so.

May we also point out that no mention was made of Alabama's so-called Wallace Act. This act permits Alabama municipalities to issue revenue bonds to raise funds for the construction of industrial buildings. These buildings can be made available to industry on long-term lease and lease-purchase agreements. Inasmuch as

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

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payments to the bondholders are not subject to state or federal taxes, this is a preferred source of capital. . . .

PLEAS LOONEY  
Director  
Planning & Industrial Development  
Board  
State of Alabama  
Montgomery, Ala.

### More on Houston

TO THE EDITOR: . . . It would be hard to improve upon the [Houston Ship Channel] story (June 8, p. 46) and the illustrations. . . . Of course, you know the Texas Butadiene Co. plant was located by this firm several miles north of the channel, with frontage on the San Jacinto River for barging purpose.

We might also call your attention to the site Jones & Laughlin has optioned on the east side of Greens Bayou, which is tributary to the Houston Ship Channel.

There are also plans of extending spur channels from the main Houston Ship Channel where it crosses Trinity or Galveston Bay west to the mainland to serve a site selected by Texas Gulf Sulphur Co. and also a site on Dickinson Bayou, which empties into the Trinity or Galveston Bay. . . .

R. O. BURCHFIELD  
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Houston

### New Approaches

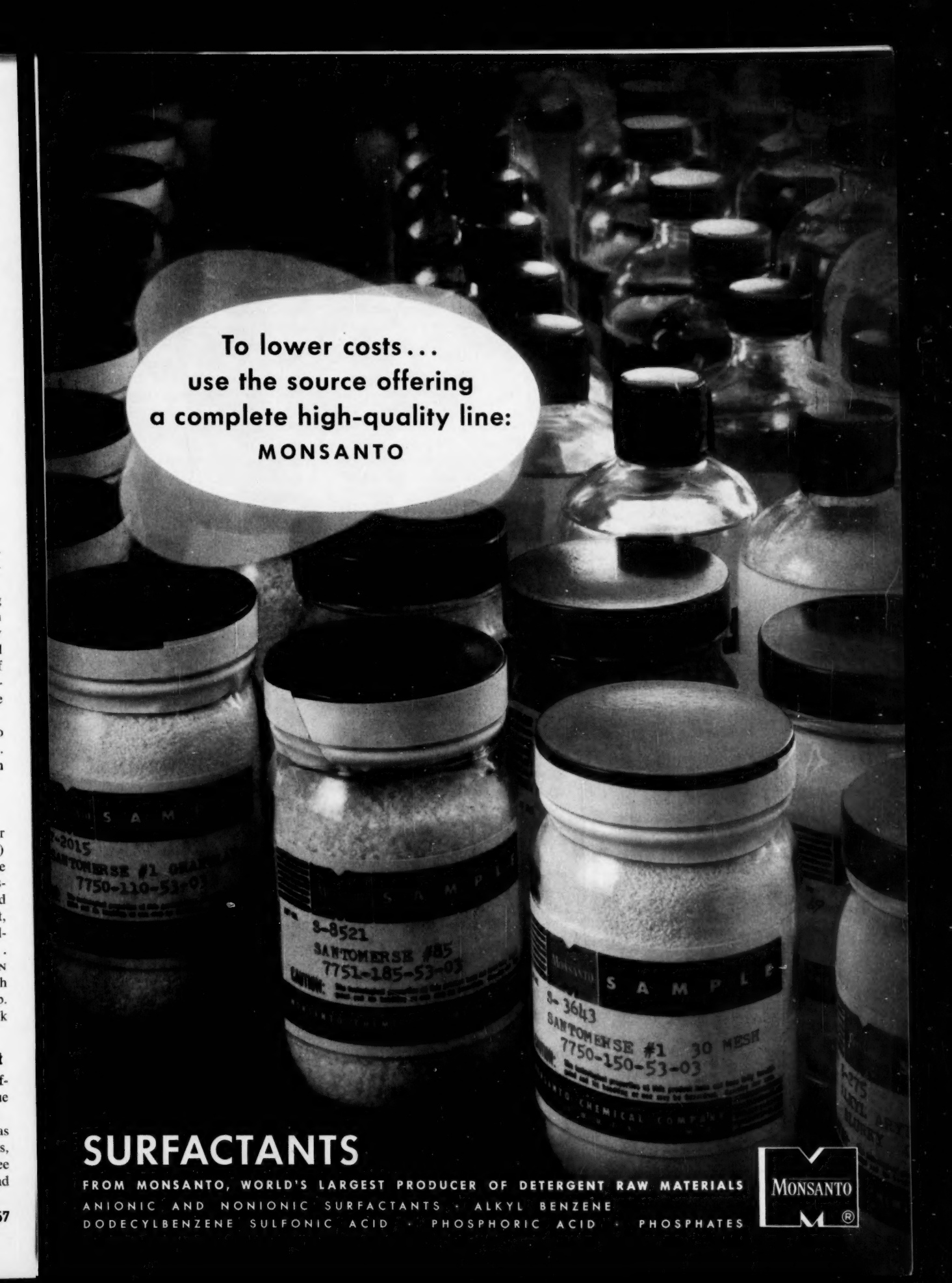
TO THE EDITOR: The article "Your Next Capital Venture" (June 15) by Bates and Weaver presented some new (to me) approaches to the question of capital investments. Referred the article to our finance department, which is highly interested in this well-prepared and informative article. . . .

JACK WATSON  
Director of Market Research  
J. M. Huber Corp.  
New York

### All-Winter, Not Permanent

TO THE EDITOR: This is with reference to p. 70 of the May 18 issue—the article on antifreeze. . . .

All authoritative sources, such as the Society of Automotive Engineers, Bureau of Standards, ASTM, agree that antifreeze is not permanent and



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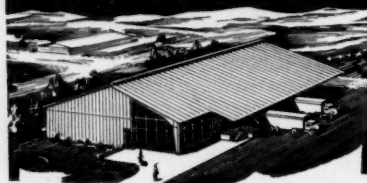
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## OPINION

should not be kept in the cooling system through the summer. Manufacturers of ethylene-glycol-based antifreeze make no claims of permanence for the product nor for the inhibitors and conditioners in the liquid. The popular term for ethylene-glycol-based antifreeze is all-winter antifreeze. Using it beyond the winter term for which it is formulated may result in damage to your car's cooling system. . . .

GEORGE B. MOYNAHAN  
Manager of Advertising  
Union Carbide Chemicals Co.  
New York

*The Chemical Specialties Manufacturers Assn., from which we obtained our information, refers to glycol-type antifreeze as "permanent."*  
—Ed.

## Penick Brominates Oils

TO THE EDITOR: We have observed the CW (June 8, p. 94) news item captioned "Pop Stabilizer." This article deals with a new brominated cottonseed oil product being manufactured and marketed by Swift and Co., and it mentions that similar products are being made by Abbott and Kohnstamm.

We respectfully call your attention to the fact that our company is one of the oldest and largest producers of brominated vegetable oils in the United States. Brominated apricot kernel oil, brominated sesame oil and others have been specialties in our manufacturing laboratories for many years.

Our brominated vegetable oils, under the registered tradename Bromvegol, enjoy wide distribution not only in the United States but in many foreign countries as well. . . .

E. G. ALLISON  
Manager  
Essential Oils and Aromatics Division  
S. B. Penick & Co.  
New York

## Seeks Fungus Research

TO THE EDITOR: The very informative article (June 1, p. 55) describes the devastating results of oak wilt (*Chalara quercina* Henry) in scary tenor . . .

The first paragraph states "no chemical or other treatment yet exists that can bar the fungus's progress

without killing the tree." The second paragraph ends with "But only a few chemical companies have tackled it." This latter is doubtless correct.

If *Chalara quercina* Henry (a soil-borne, cellulolytic, either aerobic or anaerobic organism) is the sole culprit, its habitat would be found in carbon-containing soil crusts. We do know that carbon is essential to fungus growth. But, regardless of how and where this fungus enters, the application of systemic fungicides alone is rather hopeless. One of Liebig's students, Dr. Holzhauser, in his book, "Holz Zucht," published in the early '90s, does explain the subsoil preference of trees, the importance of either watering or draining, suiting specific stands, brush-growth control, thinning, spacing and fungus deterioration. We cannot argue the fact that oaks, in a major sense, are hardwood plants. Excess water attacks and promotes spongy roots in fungus-teeming areas, particularly detrimental to oaks.

This controversial approach to the problem is an effort to contact a well-oriented savant who will enlighten me on summary field work results, i.e., why chemical experimentation has failed. I am interested in assisting.

H. L. VON GOEHDE  
Manufacturing Chemist  
Boston, Mass.

## MEETINGS

**British Plastics Exhibition and Convention**, Olympia London Grand & National Halls, London, July 10-20.

**Denver Research Institute, Metallurgy Division**, 6th annual conference on industrial applications of X-ray analysis, Albany Hotel, Denver, Aug. 7-9.

**American Institute of Chemical Engineers, and the American Society of Mechanical Engineers**, 1st national conference on heat transfer, Pennsylvania State University, University Park, Pa., Aug. 12-15.

**Northwestern University** conference on liquid scintillation counting, Technological Institute, Evanston, Ill., Aug. 20-22.

**American Soybean Assn. and National Soybean Processors Assn.**, annual meeting, Leamington Hotel, Minneapolis, Aug. 26-28.

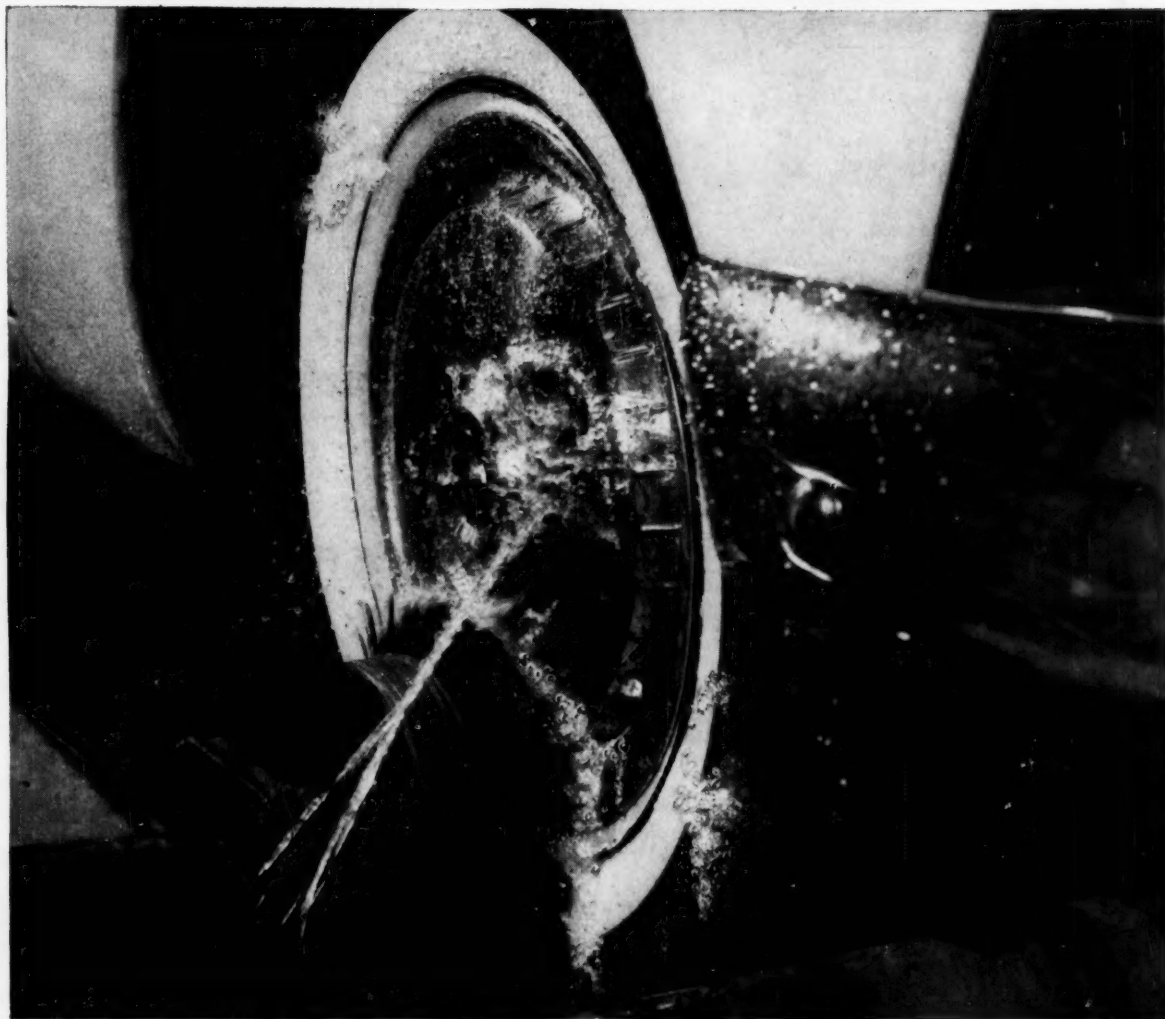
**Fisk University**, 8th annual infrared spectroscopy institute, Nashville, Aug. 26-30.

**Instrument Society of America**, international symposium on gas chromatography, Kellogg Center for Continuing Education, East Lansing, Mich., Aug. 28-30.

Chemical Week • July 20, 1957



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With recently expanded laboratory facilities, Enjay's staff of highly trained technicians is ready to help *you* find new ways to new products through Enjay Petrochemicals. For further information, contact the Enjay Company.

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Numerous products operate efficiently only when foam is effectively controlled. For wherever there are liquids containing dispersed materials, foam is a threat. Nopco's chemists have a long head start in controlling foam—have probably more experience in this important field than any other group in America. Why not give them a try at *your* most immediate production headache—in foam or wherever practical chemistry can help? Just write Technical Research Department, Nopco Chemical Company, Harrison, New Jersey.



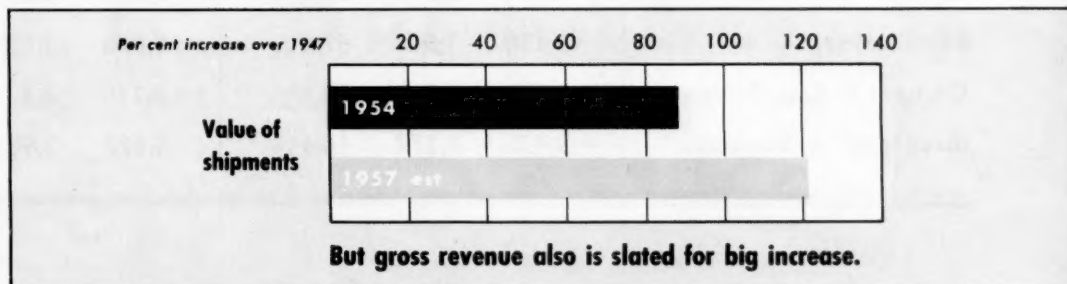
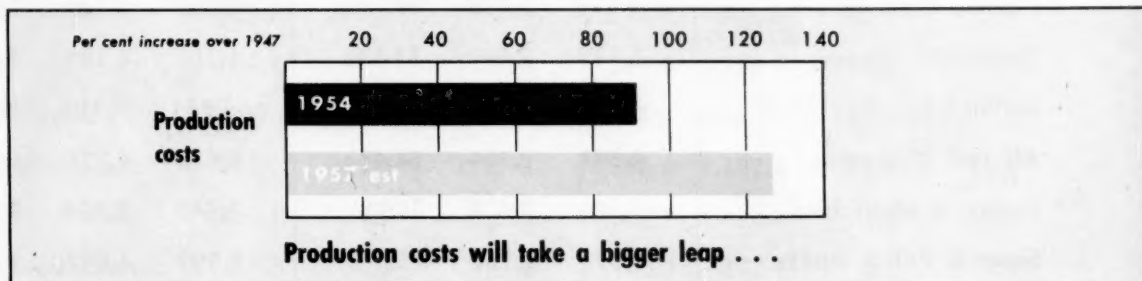
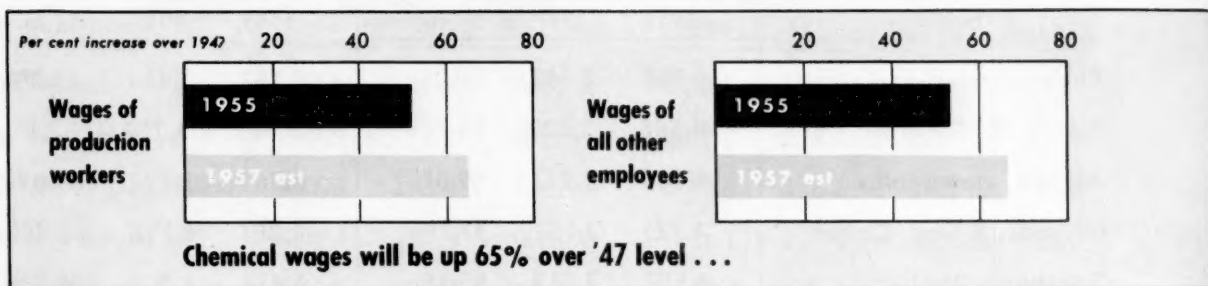
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**Nopco processing chemicals include:** Esters, Ethylene Oxide Condensates, Amides, Metallic Soaps, Sulphonates, Water Soluble Polymers, Resin and Wax Emulsions

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For complete information see Chemical Materials Catalogue—Pages 373-376

## What the figures foretell about '57



SOURCE: U.S. BUREAU OF THE CENSUS, COMMERCE DEPT.; 1957 TOTALS ARE CW ESTIMATES BASED ON THE BUREAU'S FIGURES.

## Census Data Profiles Seven Years' Growth

Figures released just last week fill in final details of a sweeping seven-year picture of record growth in the chemical process industries.

The U.S. Bureau of Census has just updated several categories of its first complete "Census of Manufacturers" since 1947, which includes an exhaustive survey of the chemical industry.

In a series of pamphlets, the bureau gives detailed information on virtually all important phases of chemical manufacturing, including statistics on wage rates,

costs of manufacturing, value of shipments, new capital expenditures, geographical locations of plants, types of plants, number and classification of employees, amounts of power used, and value added by manufacturing. The detailed data is provided for most of the various types of chemical producers.

Following are highlights of the survey:

**INDUSTRIAL INORGANICS**—The general category of industrial inorganic chemical manufacturers has three subdivisions to cover establishments primarily

# How Wages, Production Costs, Value of Ship

Industry	Annual Wages; Production Workers			Annual Wages; all other employees		
	1955	1947	% increase	1955	1947	% increase
Sulfuric Acid	4,268	2,845	50.0%	5,167	3,484	48.3%
Alkalis & Chlorine	4,685	3,029	54.7%	5,966	3,790	57.4%
All Ind. Inorganics	4,645	2,921	59.0%	6,364	3,792	67.8%
Intrmds. & Org. Colors	4,321	3,151	37.1%	6,881	4,291	60.4%
Synthetic Rubber	4,982	3,213	55.1%	6,414	3,807	68.5%
Plastic Materials	4,618	2,902	59.1%	6,363	4,122	54.3%
Synthetic Fibers	3,939	2,599	51.6%	6,282	4,188	50.0%
Explosives	4,264	2,917	46.2%	5,961	4,191	42.2%
All Ind. Organics	4,541	2,904	56.4%	6,520	4,116	59.4%
Drugs & Medicines	3,824	2,438	56.8%	6,542	3,824	71.1%
Soap & Reltd. Pdcts.	4,028	2,760	45.9%	5,901	4,447	32.7%
Gum & Wood Chem.	3,462	2,212	56.5%	5,517	3,866	42.7%
Fertilizers	3,130	1,986	57.6%	5,075	3,517	44.3%
Compr. & Liq. Gases	4,220	2,768	52.5%	4,715	2,899	62.6%
Insectcds. & Fungcds.	3,436	2,312	48.6%	5,626	3,989	41.0%

engaged in making either sulfuric acid, alkalis and chlorine, and a few other industrial organics. (Makers of hydrochloric, phosphoric, nitric, boric and other inorganic acids as well as salts of potassium, sodium, aluminum, calcium, etc., are classified separately.)

The first of these subdivisions takes in sulfuric acid producers of 90% specialization in the manufacture of the acid. Industries which make lesser quantities of the acid, or produce it as a by-product, are listed separately.

The survey documents the trend toward greater use of the contact process. In 1947, 85 establishments were making the acid by the chamber process, 85 by the contact process. In 1954, only 77 used the chamber process exclusively, while the number of contact processors had jumped to 120. Reasons: growing demand for stronger acid, more easily produced by the contact process;

economies in transportation of the concentrated acid.

Sulfuric acid shipments in 1954 were valued at \$140 million; value of shipments in 1947 was \$60 million. Total number of employees in the sulfuric acid industry has risen from 3,110 in 1947 to 3,954 in 1955.

In the division of alkalis and chlorine, process switching again is evident. Caustic soda by the lime-soda process accounted for 19% of total production in 1947, 15% in '54. The number of plants using the lime-soda process declined from nine in '47 to seven in '54. The electrolytic process—which yields chlorine, of course—has gained proportionately. Chlorine demand has almost doubled since 1947.

**INTERMEDIATES, ORGANIC COLORS** — Plants manufacturing cyclic intermediates, dyes, color lakes and toners have not shown the striking growth



## ments and Capital Expenditures Have Fared

Industry	Raw Material & Production Costs \$ million			Value of Shipments \$ million			Capital Expenditures \$ million in 1955
	1954	1947	% increase	1954	1947	% increase	
Sulfuric Acid	73.1	29.5	148.0%	139.3	60.6	129.9%	N.A.*
Alkalis & Chlorine	148.9	94.7	57.2%	399.9	208.6	91.7%	35.9
Intermds. & Org. Clrs.	353.3	218.8	61.5%	715.6	478.6	49.5%	37.5
Synthetic Rubber	208.1	137.8	51.0%	361.1	235.2	53.5%	11.0
Plastic Materials	684.2	280.8	143.7%	1,231.4	478.3	157.4%	114.9
Synthetic Fibers	523.7	262.6	99.4%	1,240.9	705.3	76.0%	22.9
Explosives	184.2	61.7	198.7%	389.6	136.4	185.8%	N.A.
All Ind. Organics	3,000.1	1,522.0	97.1%	6,214.6	3,067.4	102.6%	267.2
Drugs & Medicines	620.0	449.9	37.8%	1,956.6	1,197.8	63.3%	53.5
Soap & Reltd. Pdcts.	755.1	799.7	-5.6%	1,582.7	1,400.7	13.0%	19.3
Gum & Wood Chems.	81.3	80.7	0.6%	143.3	143.0	0.1%	8.7
Fertilizers	610.4	334.0	82.7%	862.8	505.5	70.7%	45.8
Compr. & Liq. Gases	56.4	26.7	111.7%	167.7	93.5	79.4%	19.2
Fungcds. & Insectcds.	122.5	42.0	191.7%	174.6	67.0	160.6%	N.A.

\* Not Available

noticeable in some other areas of the CPI. Although this industry's shipments were well over \$715 million in 1954, compared with \$479 million in '47, much of the increase is "price growth," created by steadily rising costs. The number of people employed in the industry actually decreased from 34,600 to about 32,500.

**PLASTICS**—Molders of plastic materials are not included in the plastics classification. The figures sketch a picture of dynamic growth. Value of shipments zoomed from \$478 million in 1947 to \$1,231 million in 1954. The number of employees increased from 28,000 to 44,000. And prospects look equally bright. At their present growth rate, shipments should easily top \$1.5 billion by the end of '57.

**SYNTHETIC FIBERS**—This category includes only plants which primarily manufacture rayon, nylon and

other synthetic fibers for further textile processing. Textile weaving and spinning mills, as well as glass-fiber producers, are elsewhere classified.

Shipments were \$705 million in 1947, reached \$1,241 million by 1954. While rayon and nylon are still going strong, much of the growth is due to the success of relatively new fibers such as the acetates, polyesters, acrylics and proteins. There is rugged competition among domestic firms, with additional competition from overseas makers. This, and the industry's ventures into automation, probably account for the drop in total number of employees from 68,600 in '47 to 63,700 in '55.

**SYNTHETIC RUBBER**—Data here covers only plants making synthetic rubber. Plants making related materials—e.g., nonvulcanizable elastomers and rub-

ber-processing chemicals—are not included.

Much of the data covered applies to government-owned plants operated for the Reconstruction Finance Corp. and successor agencies. Most have continued production under private management (many were sold to private firms in 1955) and statistics gained during the '47-'55 period do apply to some degree.

### For the Full Census

Detailed data from the 1954 Census of Manufacturers for each segment of the chemical industry are now available in the Census Bureau's MC-28 series; data for 1955 are available in series MAS-55-2. Each series is available from the Census Bureau, Washington 25, D.C. Data from the entire 1954 census will be available in three bound volumes, to be published later this year.

A healthy increase in shipment value is plain, the \$361 million worth in 1955 being well over the \$235 million of '47. And the number of employees is up to about 8,600 from 7,600. With the many recent developments, notably synthetic "natural" rubber, there's every indication that the industry will continue its present growth pattern.

**EXPLOSIVES**—This category includes plants making blasting powders, high explosives, nitrated carbohydrates, safety fuses, detonating caps and powders for sport use. Small-arms and fireworks manufacturers are not included.

Showing a 186% increase in its shipment values between 1947 and 1954, the explosives industry seems headed for an even greater boom within the next few years. Reason: besides a normal sales increase, the government's \$41-billion highway program will create new demands that should boost shipments well over '54's \$390 million mark.

**SOAP, RELATED PRODUCTS**—An interesting transformation has taken place in this industry. Since 1947, soap sales have dropped off about 50% while synthetic detergents skyrocketed as much as 500%. The

survey reveals that, in 1947, manufacturers shipped \$800 million worth of soap products and \$108 million worth of detergents. But in 1954, the totals were \$343 million worth of soap products and \$443 million worth of synthetic-organic and alkaline detergents. The substantial decline in soap sales was more than offset by detergent sales, so that the over-all increase in shipment values was a relatively small 13%.

**FERTILIZERS**—This data takes in makers of both mixed and unmixed fertilizer materials. But establishments dealing in tankage, meat scraps, bone meals and dried blood for fertilizer aren't included.

This industry's sales, of course, are highly seasonal. Most of the data was gathered on a fiscal-year basis, ending June 1954. The recent pinch on farm income was just starting, so corresponding declines in fertilizer sales aren't reflected.

Although fertilizer producers admit they had a rough time of it during late '55 and early '56, most feel that the outlook for this year and next is good. Recent passage of soil-bank legislation is thought by many to be a good sign.

**Compressed & Liquefied Gases:** The number of employees in the industry has increased from 2,768 in 1947 to 4,220 in 1955. In the same period shipment values rose 79.4% to \$167.7 million.

Probably the biggest gainer was oxygen. Besides an ever-increasing use in the expanding steel industry, oxygen has become a vital necessity for the government's missile program. (*CW*, May 25, p. 23). It's estimated that overall U.S. capacity for liquid oxygen alone will reach 40 billion cu. ft. by the end of '57. That's 60% above last year.

Production of acetylene in 1955 was up 33% over 1954. But its rate of increase is expected to slow somewhat from now on. Reason is a leveling-off in demand for making plastics.

The outlook for all chemical processors, according to the survey and from interviews with industry representatives, is generally good. Although the data indicate some weak spots, '54 was not a particularly good year. Most chemical processors with poor showings in '54, picked up in '55 and '56.

### Merger in the Making

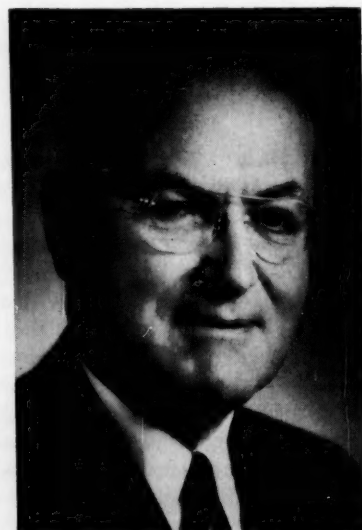
Plans for merger of Pfaudler Co. and Permutit Co. came last week, hard on the heels of Pfaudler's purchase of 25% of Permutit stock. Name of the proposed firm: Pfaudler-Permutit, Inc.

Pfaudler (Rochester, N.Y.), builder of glassed-steel industrial processing equipment, purchased its quarter-interest in Permutit two weeks ago from giant Ward Industries for an undisclosed amount. The block of stock—shares—is the largest held by any one single group in the 44-year-old manufacturer of water-conditioning equipment and exchange-ion resins.

The proposal soon to be submitted to stockholders allows Pfaudler shareholders to exchange one share for 1.429 shares of the new firm; Permutit shareholders can exchange on a one-for-one basis.

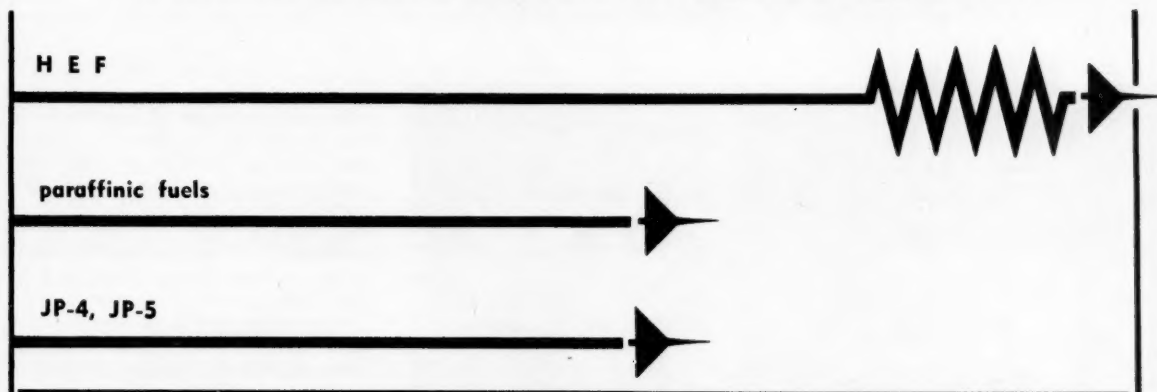
**Executive List:** Permutit's board-chairman and president, Henry Foulds, would take over leadership of the merged corporation as chairman. Pfaudler would contribute Ranlet Miner, its board chairman, and Mercer Brugler, its president, to the new company as vice-chairman and president, respectively.

The merger, which cannot be effected until stockholders vote—and that is not expected before early fall—would bring together firms with total sales last year of about \$37 million.



**FOULDS:** Heading an assault on markets for water-treatment equipment.

## Distance is the Dividend of High-Energy Fuels



One pound of HEF takes an aircraft 40-50% farther than does a pound of the best hydrocarbon fuels.

Olin Mathieson last week laid the cornerstone of the \$36-million high-energy boron-fuels plant that it will build and operate for the Air Force at Model City, N. Y. At the same time, for the benefit of the inquiring press, it threw open the doors of its own \$5.5-million semi-commercial plant making the same type of product at nearby Niagara Falls. What emerges as the fanfare dies down: the most complete picture yet available of the government's high-energy fuels program.

Some of the most helpful clues given by Olin Mathieson deal with the number and relative size of its operations in that area:

- The semi-commercial plant located at Niagara Falls was built with OM's own money and is tagged COP (company-owned plant). It is making HEF-2 (high-energy fuel number 2), has, in fact, already made shipments to the Air Force.
- The interim plant—at Model City—is being built for the Navy. Although it is three-times as big as the \$5.5-million COP, it will cost only \$4.5 million. That's because COP is "completely integrated" while Metal Hydrides is building a \$5.25-million Navy plant to supply Model City with sodium borohydride, one of the key ingredients. The interim plant is due to start up near the end of this year.
- The big, \$36-million Air Force plant—also at Model City—will make HEF-3. It will be 4.6-times as big as the interim plant, 12.6-times as big as COP. It is due in late next year.

**What's the Difference?** The exact identity of the boron fuels has never been publicly pinpointed. But they are known to be alkyl boranes (*CW Technology Newsletter*, Aug. 11, '56). It is now clear that HEF-2 is an alkylated pentaborane and HEF-3 an alkylated decaborane. And it seems certain that the alkyl groups are ethyls.

Pentaborane itself has attracted interest as a fuel

long before the contracts for the big plants were signed (*CW Technology Newsletter*, April 7, '56). Theoretically, it would release twice the energy of a hydrocarbon and has physical characteristics that make it highly desirable for a fuel. It fell down on stability.

HEF-2, on the other hand, is said to be easy and safe to handle. Its performance, although not quite as good as pentaborane's, is a lot better than that of hydrocarbons. Olin Mathieson says that pentaborane can give increases in range to aircraft of 50-60%, but talks of increases of 40% from its high-energy fuels.

Decaborane, too, has nailed down attention as a fuel. But it poses problems because it's a solid at room temperature. Additional treatment is required to convert it to liquid HEF-3.

**How They're Made:** The little that has been breathed about the chemical makeup of the fuels has been a roar compared to what has been revealed about the way they are made. But this much can be said with certainty: In Olin Mathieson's plants, as well as in the comparable one being built by Callery for the Navy, (*CW Business Newsletter*, March 16, *et priori*) the main steps are the same—(1) preparation of diborane, (2) conversion of diborane to pentaborane or decaborane, (3) alkylation.

The big difference in all the plants is the approach to making diborane; from that point on, all the processes are nearly identical.

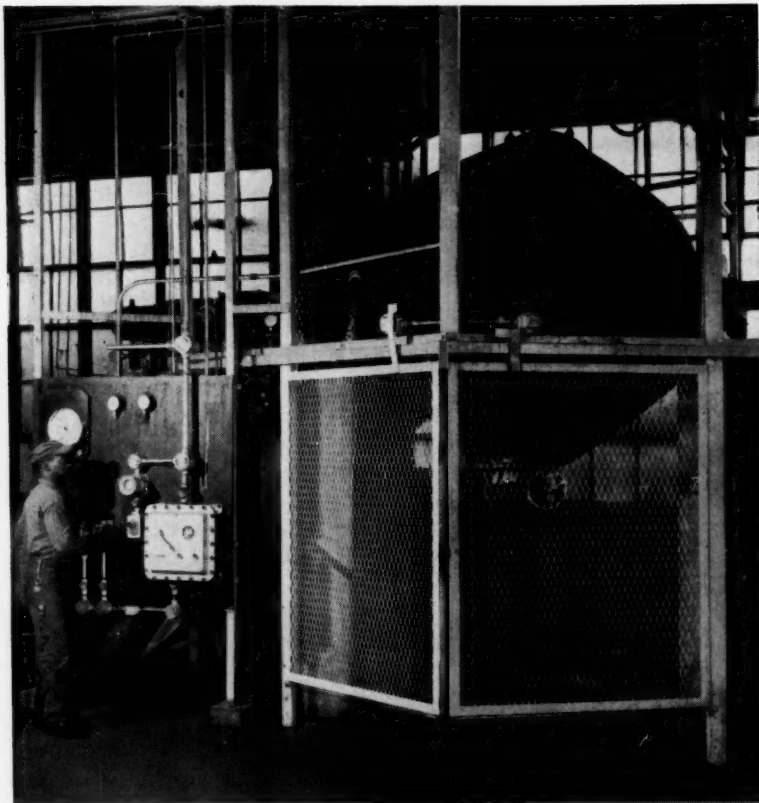
Olin Mathieson itself is using at least two different methods of making diborane. In the semicommercial plant, it is probably reducing boron trichloride with lithium hydride. The lithium hydride is slurried with a solvent (e.g., ether), fed to another section where it's reacted with the trichloride. All the early literature points to such a reaction using boron trifluoride. But it is known that OM is getting boron trichloride for the project from Stauffer. Diborane is converted to pentaborane by pyrolysis.



**EXTRA FAST DELIVERY**  
of standard Pfaudler stainless steel reactors now!  
**SEND FOR BULLETIN NO. 944**

# Pfaudler

Pfaudler Corrosioneering News Published by The Pfaudler Co., Rochester, N. Y.



The Pfaudler conical dryer-blender eliminates losses from material flying off in the air. No manual handling of the contents is required

as the receiving container can be placed neck to neck with the discharge opening.

## Toms River-Cincinnati Chemical reduces dyestuff drying time by 90%

A particular problem at the Cincinnati plant of the Toms River-Cincinnati Chemical is drying dyestuff intermediates that are sensitive to air absorption at elevated temperatures.

Drying time has been reduced from 36 hours, required for chamber drying, to 4 hours using a Pfaudler glassed steel conical dryer-blender. In the tumbling action of the Pfaudler conical dryer-blender, the drying is simultaneous throughout the charge, drastically cutting 90% off the time required for each batch. In addition, a better product is obtained because the material is exposed to elevated tem-

peratures for a much shorter period.

Labor costs per pound of material handled have been reduced by 50%. The material to be dried is introduced directly into the drying chamber of the Pfaudler conical dryer-blender. There's no intermediate manual handling required.

The corrosion and contamination problem associated with chamber drying is completely eliminated with the Pfaudler conical dryer-blender. The material is poured directly into the glassed steel drying chamber which protects the contents against contamination and prevents corro-

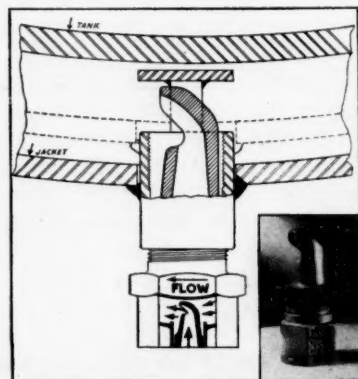
sion of equipment.

Because the dyestuff intermediates have a very fine consistency, unloading from the pans is a very dusty operation, and is accompanied with some losses. With the Pfaudler conical dryer-blender, the material is removed from the bottom. The neck of the receiving container is neck to neck with the discharge opening.

If your present drying cycles are too lengthy, if your product requires more thorough blending, and/or if you are faced with corrosive attack of existing equipment, it will pay you to examine the tremendous advantages offered by the Pfaudler glassed steel conical dryer-blender. You can use them for every kind of acid except hydrofluoric and hot concentrated phosphoric—for all alkalies up to pH 12 at 212° F.

Sizes range to 165 cu. ft. working capacity and are available in four different diameters: 2 ft., 4 ft., 6 ft., and 8 ft. You can test your products in our laboratory or in your plant with a Pfaudler loan unit. Send for Data Sheet 26. It will give you all the details.

## New data on turbulent flow in reactor jackets



Capacities and characteristics of the Pfaudler Agitating Nozzle and its superiority over the commonly used spiral jacket are discussed in a new bulletin No. 950. Working basis for the agitating nozzle is the use of kinetic energy. This is available through the pressure and volume of the heating or cooling liquid delivered to the



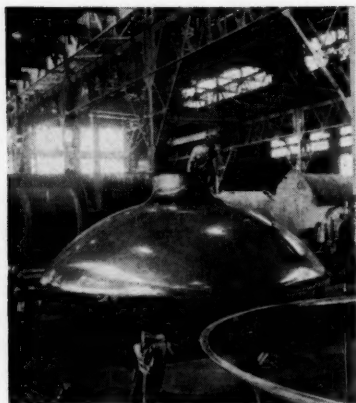
# Corrosioneering News

Quick facts about services and equipment available to help you reduce corrosion and processing costs.



reactor as a direct means of producing circulatory movement of entire contents of jacket. Capacity chart and typical hookup of nozzles are shown. Method of selecting nozzles is fully covered. Ask for Bulletin No. 950.

## Custom-built copper and copper alloy process equipment



Pfaudler can fabricate copper or copper alloy vessels to your process requirements.

If your process involves acid solutions of low oxidizing capacity, copper or copper alloys may be one answer to your equipment construction problem.

As corrosion specialists, Pfaudler fabricates numerous metals and alloys, including copper and copper alloy vessels and tanks. With many years experience in brewery equipment manufacture, where copper is widely used, Pfaudler coppersmiths are second to none. Their craftsmanship is attested to by the long-term performance record of their wares.

For large or small equipment, Pfaudler copper manufacturing facilities are complete and economical. If you require heat treating, our furnace capacities will handle vessels up to 13 feet in diameter by 45 feet in length.

Discuss your next custom copper fabrication with Pfaudler too.

## The corrosion resistance of glassed steel to acids

The resistivity of Pfaudler's glassed steel is comparable to that of laboratory glassware. With it you can duplicate laboratory results in production operations.

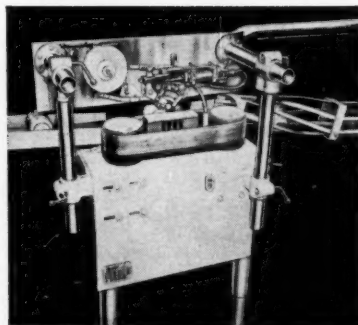
While glassed steel is inert to a wide range of operating conditions, there are factors that must be understood about its resistivity to assure long-term use of equipment.

Product temperature and concentration are important factors. Pfaudler glass is fully resistant to all acids except hydrofluoric at temperatures up to 212° F. Above the boiling point, corrosion rates sometimes increase. However, certain acid solutions at temperatures as high as 450° F. have no effect on Pfaudler glass, while others are generally restricted to not exceed the boiling point.



Bulletin No. 928 will help you understand the versatility of glassed steel with nitric, acetic, sulphuric, hydrochloric and phosphoric acid solutions. (Check coupon for copy.)

Also, our research facilities are equipped to test your product and report on its corrosive characteristics.



Pfaudler Outsert Applicator attaches message to your package automatically.

## Does your container sell the product?

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### THE PFAUDLER CO., DEPT. CW-77, ROCHESTER 3, NEW YORK

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Outside of the fact that it will be making decaborane (rather than pentaborane) derivatives, the large Air Force plant will be a scale-up of the COP. But the interim Navy plant will use sodium borohydride—instead of lithium hydride—as the reducing agent.

Callery is building two plants, the big one for the Navy at Muskogee, Okla., and a smaller one at Lawrence, Kan., that it is financing itself. It will use sodium borohydride in the big plant, presumably will do the same thing in the smaller unit.

American Potash has reported it is making decaborane in a one lb./day pilot plant (*CW Technology Newsletter*, May 18). It says only that it starts with boron trichloride, converts that to diborane and then pyrolyzes the latter to decaborane (and some pentaborane). In view of Ampot's interests in lithium, it would be logical to assume that it would be more interested in lithium hydride as the reducing agent. The company has, however, evinced more than passing interest in a sodium-based reduction.

**How Big?** The capacity of the plants has been another closely guarded secret. OM's statements last week about the relative size of the plants provide some information. Metal Hydrides' revelation of the dollar figures of its contract with the Navy\* (*CW Technology Newsletter*, April 20) provides more. From those and other considerations, *CW* estimates that OM's big, \$36-million Air Force Plant could produce 2¼ million lbs./year.

Callery's \$38-million Navy plant undoubtedly is roughly the same size. A possibly significant point in this respect, however, is that Callery has persistently referred to its project as a "chemical" plant, while Olin Mathieson talks about its "fuels" plant. Inference: Callery's is set up for more flexibility, would probably make less product per dollar of investment.

The proposed scale of production, in any case, is rather modest as fuel plants go. Assuming OM's capacity at 2¼ million lbs./year, an entire year's supply would only be enough to keep a group of ten large bombers aloft for about seven hours (*CW Technology Newsletter*, April 7, '56).

**What Do They Cost?** When it started its pilot operations, American Potash placed a developmental price of \$600-800/lb. on decaborane, said that it expected the price would go below \$100/lb. on a commercial scale. Aviation people think that it had better go way below that figure.

Olin Mathieson last week said that large-scale production prices would be low enough to permit extensive use as a fuel. In pegging the business as a billion-dollar-a-year industry within ten years, it was using a figure of \$1/gal. (*CW Technology Newsletter*, July 13, '56).

But there are some grave reservations as to whether the fuels can ever be produced for that. At the recent Commercial Chemical Development Assn. meeting at

French Lick, Ind. (*CW*, May 25, p. 23), a researcher for one of the companies in the field gave a public (but unrecorded) figure of \$1/lb. as a target.

Even that would take some doing. For instance, Stauffer this week is boasting that it has dropped the price of boron trichloride to \$1.25/lb. (see p. 100), and in a perfectly efficient system, it would take 10 lbs. of boron trichloride to make 1 lb. of pentaborane or decaborane.

There's a belief that even at the present stage of technology, the price of boron trichloride could be dropped to 60-70¢/lb. But that's still \$6-7 worth of raw materials to make one pound of fuel targeted to sell for \$1.

Sodium borohydride, of course, presents an expense of a different order. Metal Hydrides workers have said that under really big-volume production, the borohydride could be made to sell for \$10/lb. It takes almost 2½ lbs. of sodium borohydride to make 1 lb. of pentaborane.

At the French Lick meeting, Olin Mathieson's Earl Weilmuenster implied that the reducing agent would be recovered and recycled. In fact, he implied that the chlorine would be recycled, too.

But the capital investment figures indicate that right now, at least, the boron fuels should be anything but cheap: In a \$36-million plant, you could normally figure on selling roughly \$36 million worth of products a year. If the plant's capacity is 2¼ million lbs./year, the fuels should be priced at approximately \$11/lb.

Olin Mathieson makes it plain that any sort of reasoning like that doesn't apply to its fuels project. It points out that the Air Force plant is a prototype unit to make fuels for engine testing and that normal yardsticks can't be used at all.

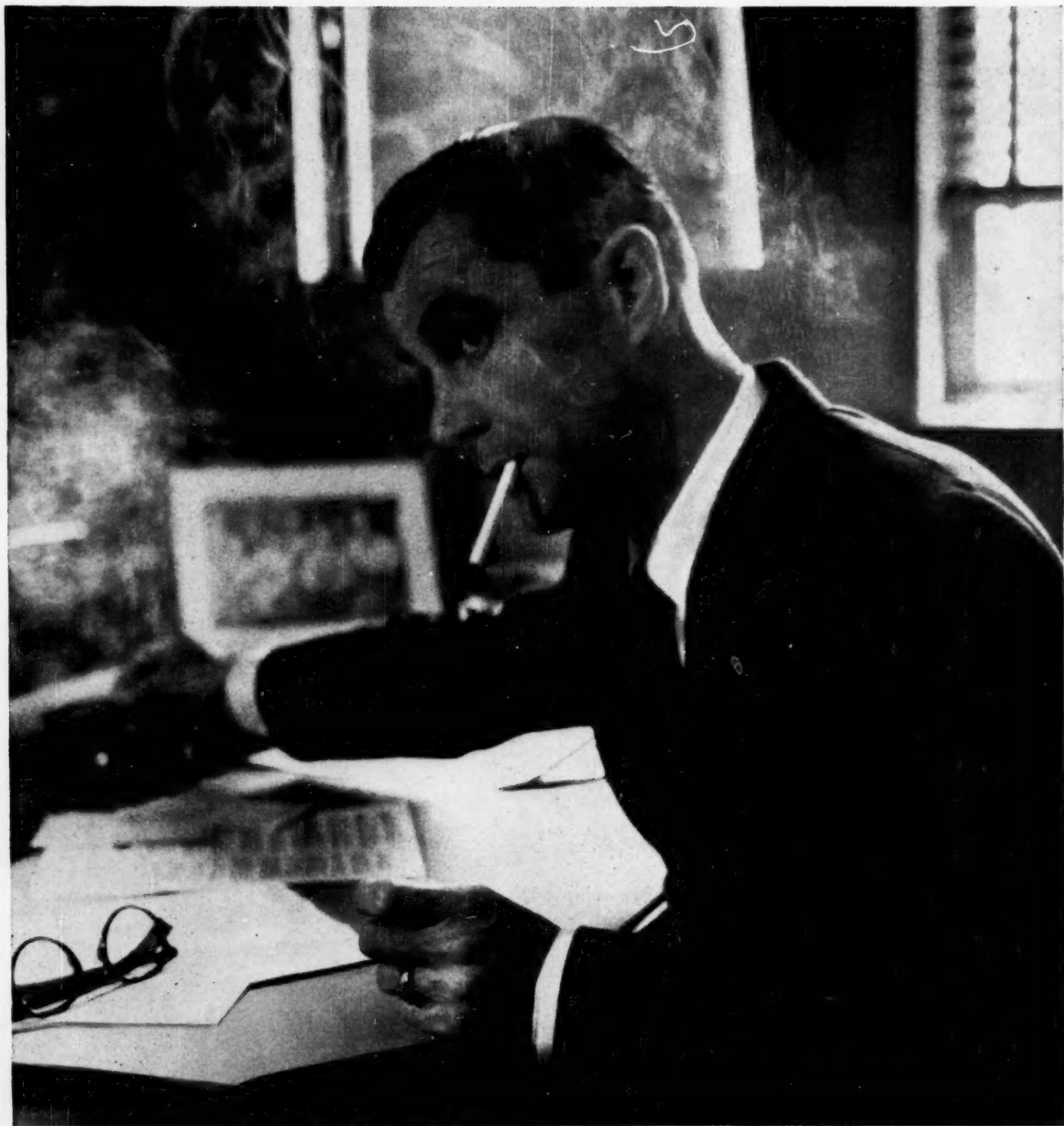
At the very heart of the matter, of course, is the military requirement for a better fuel. It's hard to put a price on the value of boosting the range or increasing the payload. In addition, the Russians are thought to have a boron-based fuel, so that rapid development might even be a question of survival. And it's impossible to equate that with economy.

## FOREIGN

**Uranium/Bavaria:** Substantial deposits of uranium have been found in four separate areas of Bavaria. One deposit, assayed 2000-6000 grams/ton, was found between the cities of Regensburg and Hof, along the Czechoslovakian border. The second is in Weissenstadt and Leupoldsdorf, where the uranium content averaged 650 grams/ton. A third Bavarian uranium find is in the city of Flossenbürg, where between 250 and 550 grams/ton is expected. The fourth area is the Wackersdorf coal fields, where uranium content assayed between 50 and 4500 grams/ton of coal was found.

The West German Atomics Ministry has set aside \$832,000 for prospecting and processing of uranium deposits.

\*Leading to the belief that the firm would supply from 300,000 to 900,000 lbs. of sodium borohydride over 18 months.



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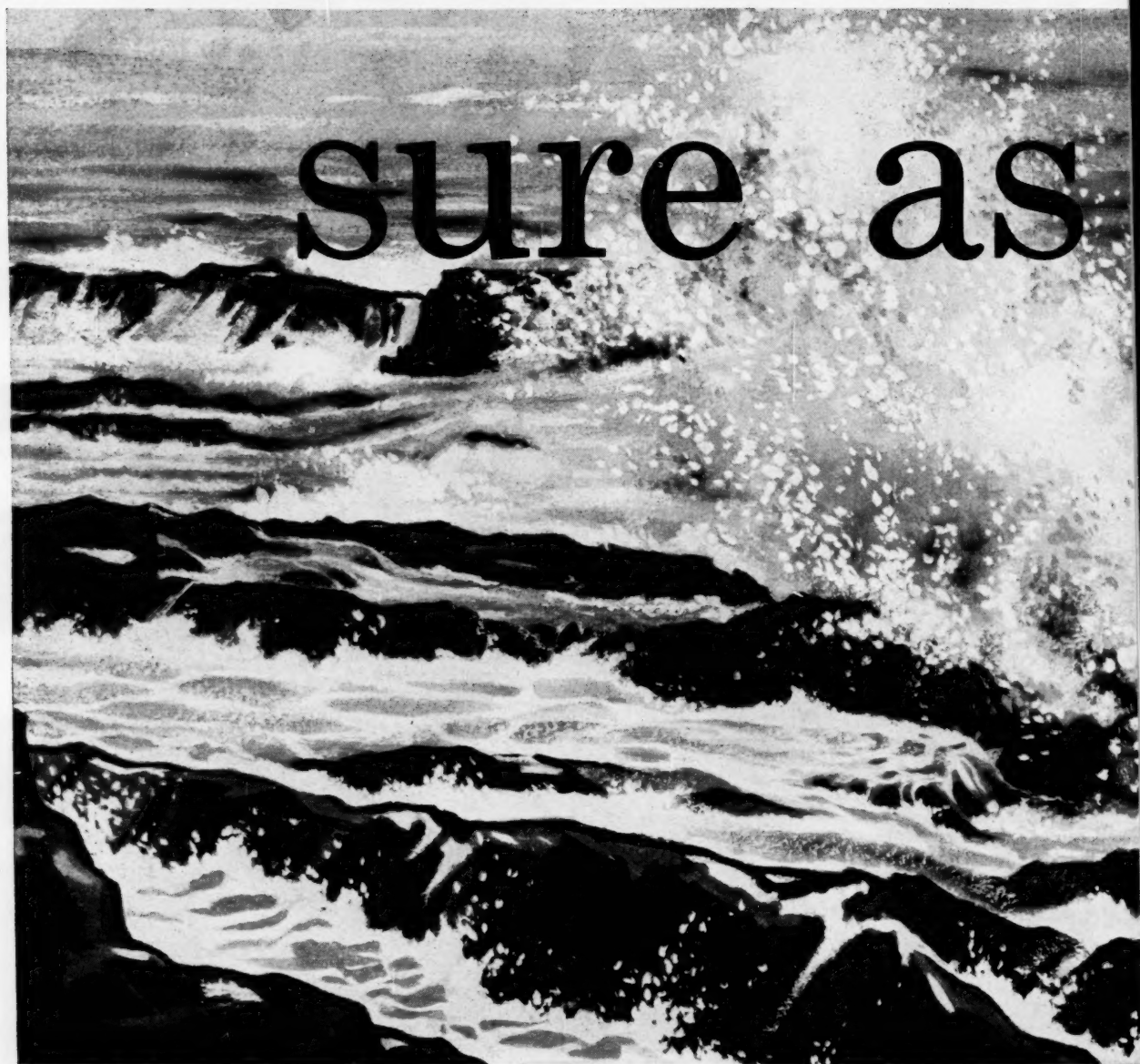
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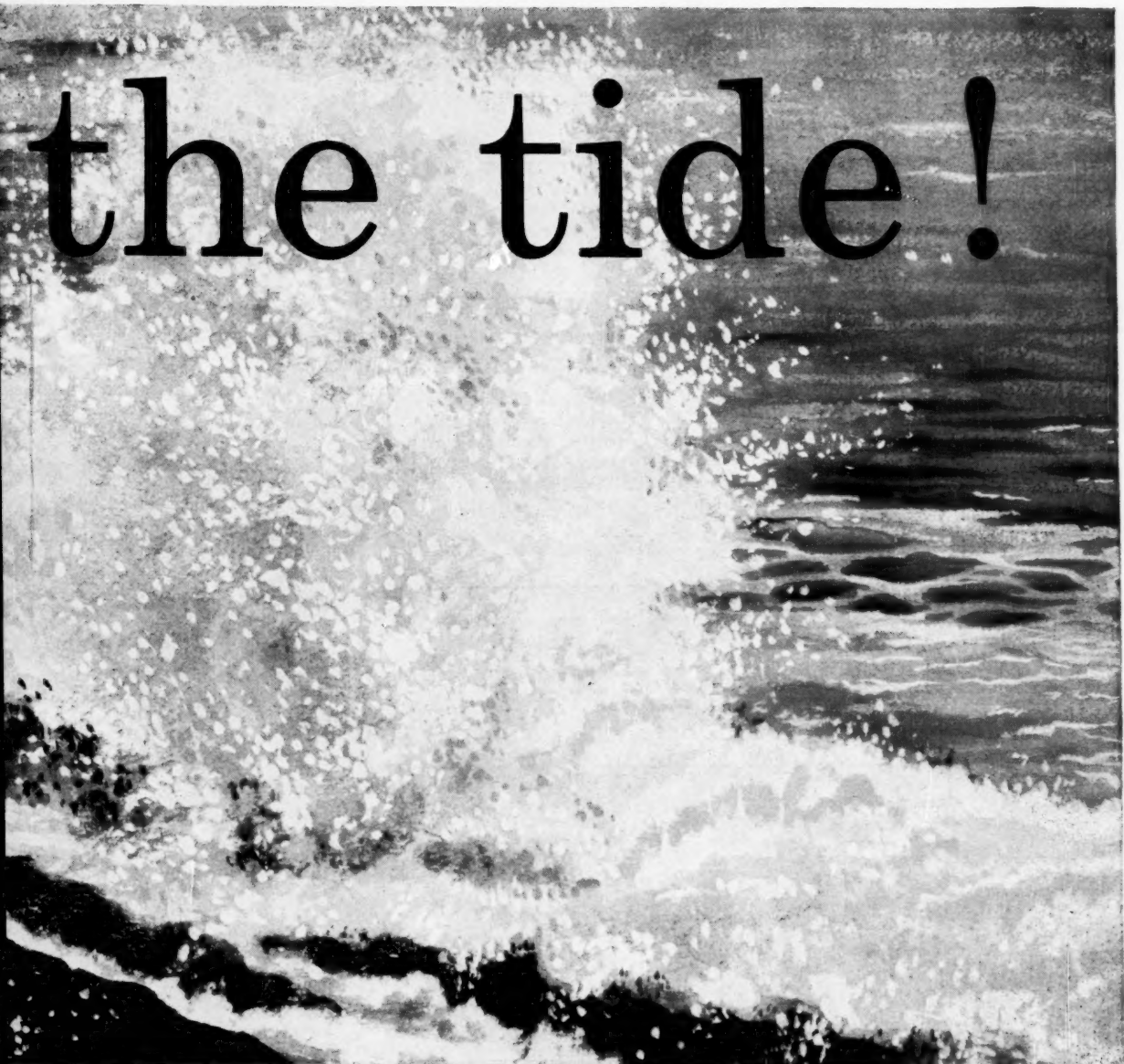
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## KOPPERS CHEMICALS



# Washington Newsletter

CHEMICAL WEEK

July 20, 1957

**There'll be no chemicals-in-foods bill voted this year**—despite the move by additive-law proponents, forcing a House subcommittee to squeeze hearings into its schedule this week. But the additive situation is now more favorable to industry than it has been for some time—due in part to the scheduled hearings.

The subcommittee, under Rep. John Bell Williams (D., Miss.), wanted to hold off industry-government testimony on controversial legal aspects until next year; for this year, focus attention on scientific problems of additives. The current hearings were to be limited to a public roundtable discussion between House members and prominent scientific experts named by the National Academy of Science.

But, because NAS couldn't round up the scientists in time, Williams had to wade right into a rehash of bitter legal controversies. But, for a change, industry got to lead off the hearings.

**This gives industry-bill proponents a host of advantages.** They get a chance to state their case first—to press for strong safeguards against arbitrary decisions by FDA in any new control setup.

The top Democrat and top Republican of the full commerce committee have jointly sponsored industry's additive bill. This strong bi-partisan team—Rep. Oren Harris (D., Ark.) and Rep. Charles Wolverton (R., N.J.)—assures equal attention for industry's proposals, could help offset the initial advantage chalked up by FDA, which sent its own stiff bill to Capitol Hill with strong backing from the Administration.

**The food-additive issue may profit from the civil rights debate.** Don't be surprised if industry lawyers seek to link the jury trial issue now being debated in the Senate to the somewhat similar additive dispute between industry and FDA.

FDA wants blanket authority to bar use of any proposed additive, with court review of its decision limited to whether industry has a fair hearing from an FDA employee appointed to consider the case. Chemical makers protest this leaves no real protection against arbitrary FDA rulings, since courts are barred from weighing evidence of an additive's safety—the real issue involved in the FDA hearing. Industry's bill, therefore, insists on the right of a full court trial—with a regular jury—on all questions involved. The jury would decide if the additive is safe for use in foods.

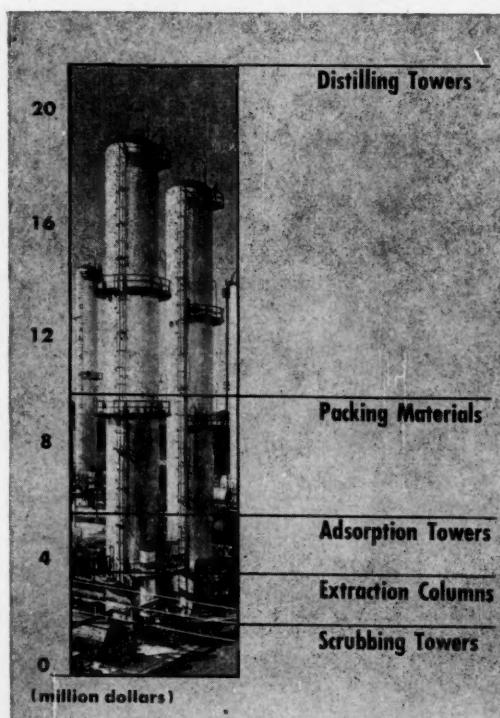
But FDA is worried that if such a linkage is attempted, it could sway some congressmen who up to now have strongly backed FDA's administrative ruling powers—including such staunch jury-trial advocates as subcommittee chairman Williams—a Mississippian—and Texas' Martin Dies.

# Charting Business

CHEMICAL WEEK

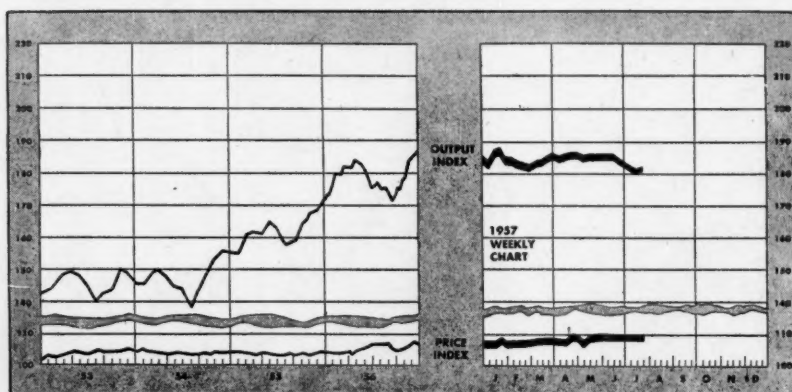
July 20, 1957

## How Tower Equipment Buying Divides



A detailed McGraw-Hill survey on direct purchases of equipment and machinery reveals that, of the various chemical process industries, the chemical industry ranks as the largest purchaser of various tower equipment. The cost of tower equipment bought by chemical producers last year was about \$22 million. About 50% of this went into distilling towers, while adsorption, scrubbing, and extraction towers accounted for \$2 million, \$1.8 million, and \$1.8 million, respectively. About \$4 million was spent for packing materials used in towers; \$300,000 went for trays and bubble caps.

Second in the lineup of tower purchasers is, of course, the petroleum industry. Last year petroleum manufacturers spent close to \$12 million for such items.



## Business Indicators

### WEEKLY

	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1947-49=100) .....	181.5	181.0	175.0
Chemical Week wholesale price index (1947=100) ..	110.3	110.1	105.3
Stock price index of 11 chemical companies (Standard & Poor's Corp.) (1941-1943=10) ..	47.21	45.96	50.75

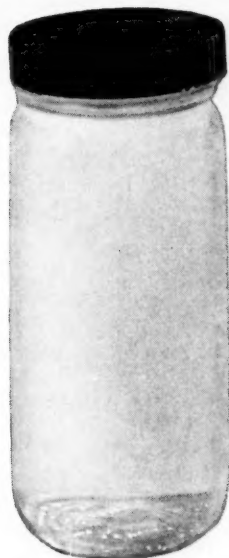
### MONTHLY INDICATORS—Wholesale Prices (Index 1947-1949=100)

	Latest Month	Preceding Month	Year Ago
All commodities (other than farm and foods) .....	125.2	125.2	121.5
Chemicals and allied products .....	109.3	109.1	107.1
Industrial chemicals .....	124.0	123.6	121.1





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Bromine Index . . .	Negligible	
Paraffin Content . . .	0.0	
Residue after		
Evaporation . . . .	Not Detectable	
Thiophene Content . .	None	
Sulfur Content . . . .	0.001% by wt.	

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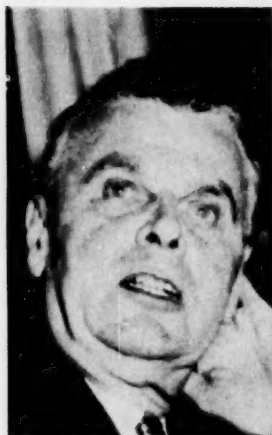
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5213-A

# ADMINISTRATION



DIEFENBAKER: His policies are likely to cause long-range changes; the question is . . .

WIDE WORLD

## Threat in His 'Canada for Canadians'?

Despite the new Canadian government's "Canada for Canadians" platform, no immediate danger is foreseen for U.S. chemical manufacturers operating in Canada. But most observers agree that it's too soon to predict long-range effects.

So far, all U.S. management has to go on is the campaign pledge of Canada's new Prime Minister, John Diefenbaker, to gain for the dominion "economic control of our own destiny." This pledge—coupled with the Conservative Party's traditional "Canada first" attitude—is taken by many to indicate a coming change in the ground rules of economic intercourse between the two North American nations. Changes almost certain to come: a tightening of the Liberal Party's "lenient" policy in dealing with the U.S., strengthening of the economic ties with England and the British Commonwealth, and an emphasizing of the role played by Canadians and Canadian capital in domestic industry.

**No Real Danger:** Despite certain inevitable policy changes, top-level spokesmen in Ottawa this week told CW's correspondent, U.S. chemical manufacturers operating in Canada—either directly or through subsidiaries and affiliates—are in no danger of being forced out. Nor are U.S. shipments of chemicals and allied products—valued at more than \$250 million last year—in any jeopardy of being kept out of Canadian markets.

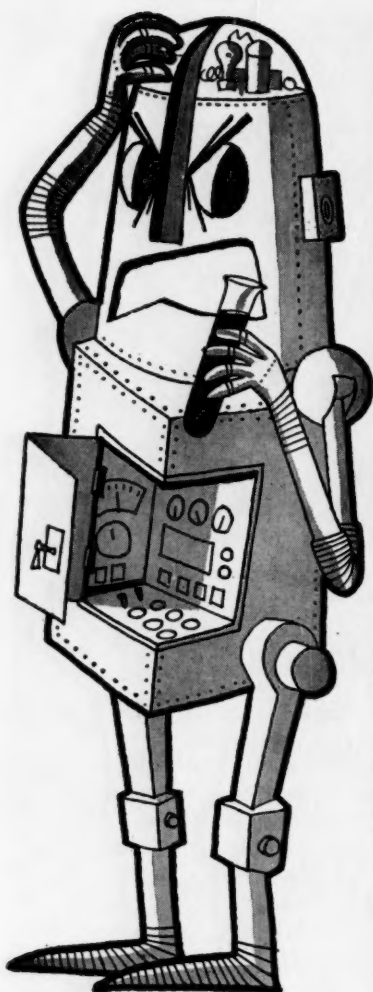
But Diefenbaker—a 61-year-old Saskatchewan lawyer who just last year won leadership of his party, following the resignation of George Drew—has warned of "a frightening and perilous adverse balance of trade" with the U.S. of \$1.3 billion last year. To remedy this, he proposes an increase in trade with the British Commonwealth and a reduction of dependence on the "uncertain" American market. To this end he has pledged to seek a Commonwealth trade conference.

Despite the fact that 65% of the national income involves foreign investments (mostly American), Diefenbaker has said, "We do not want to see it discouraged. However, we want to see that investment directed to the maximum benefit for Canada."

The new Prime Minister made it clear that the time has come to give Canadians the same rights under the law—and in particular under the income tax law—accorded foreign corporations. "We believe there should be strong incentives in the income tax law for Canadians to invest in Canadian equity stock." He added that the discriminatory method of taxing some dominion companies should be changed so that Canadians are not at a disadvantage in competition with foreign investors. Diefenbaker also favors tax reductions to encourage Canadian research in every field.

Certain steps advocated by Diefenbaker actually took place last year under the Liberal government of former Prime Minister Louis St. Laurent, when the tide of economic nationalism began to roll over Canada. One important result: preparation of an amendment to the U.S.-Canadian Tax Convention, reducing from 95% to 51% the percentage of share ownership a U.S. parent company must have to entitle it to a lower tax rate on dividends remitted by its Canadian subsidiary (CW, Dec. 29, '56, p. 90). When and if the amendment is ratified by both countries, the effect is expected to be a major increase in Canadian financial participation (in the form of equity stock) in the subsidiaries.

Renouncing what he said was a Liberal-government policy "which permits, if not advocates, that our vast irreplaceable resources should be processed to a major extent outside of Canada," Diefenbaker asked, "Why have Canadians not participated to a greater extent in industrial development? I believe that too high



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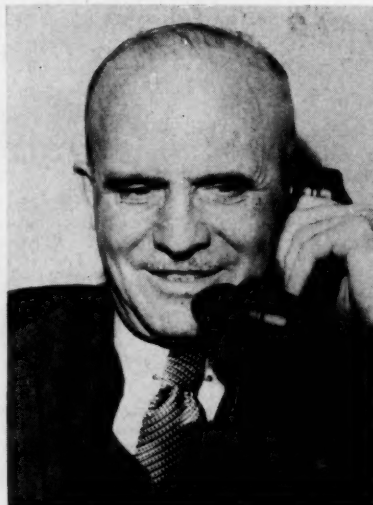
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## ADMINISTRATION



PHOTOS BY STAR

**Ministers Churchill and Fleming will implement 'Canada-first' policy.**

taxation and antiquated and out-dated tax processes are responsible in large part."

While Canada's new government is committed to more protective policies, experts point out that such necessary imports as chemicals and allied products cannot be shut off without "hitting hard" at domestic industries. What can happen, they say, is that more "encouragement" to chemical production within Canada can gradually and progressively make such U.S. imports unnecessary. This had been taking place under the Liberal government to the extent that today many chemicals and allied products are no longer imported, or at least not to the same extent they were only a few years ago. The plan now is for a speeding-up of the self-sufficiency process.

**Stiffer Tariffs Ahead:** In addition to the many other elements of uncertainty surrounding future U.S.-Canadian dealings, there is the Tariff Board review of the chemical industry (*CW*, Feb. 2, p. 32), with open hearings slated for the fall. The Canadian chemical industry has asked for varying degrees of tariff protection, particularly from U.S. imports.

Also to be watched for future developments is the new government's attitude toward foreign patents. Official policy statements are certain to follow the forthcoming report of the Royal Commission on Patents (*CW*, Dec. 15, '56, p. 36).

**Chemical Tax Cuts:** The Conservative government is certain to recom-

mend tax cuts, both personal and corporate. New Federal Finance Minister Donald Fleming—who, along with Gordon Churchill, minister of trade and commerce, will be Diefenbaker's chief lieutenant—has promised that tax cuts will be forthcoming shortly. Fleming is determined to stop what he calls "over-taxation." He was left a \$500-million surplus with which to effect such tax cuts.

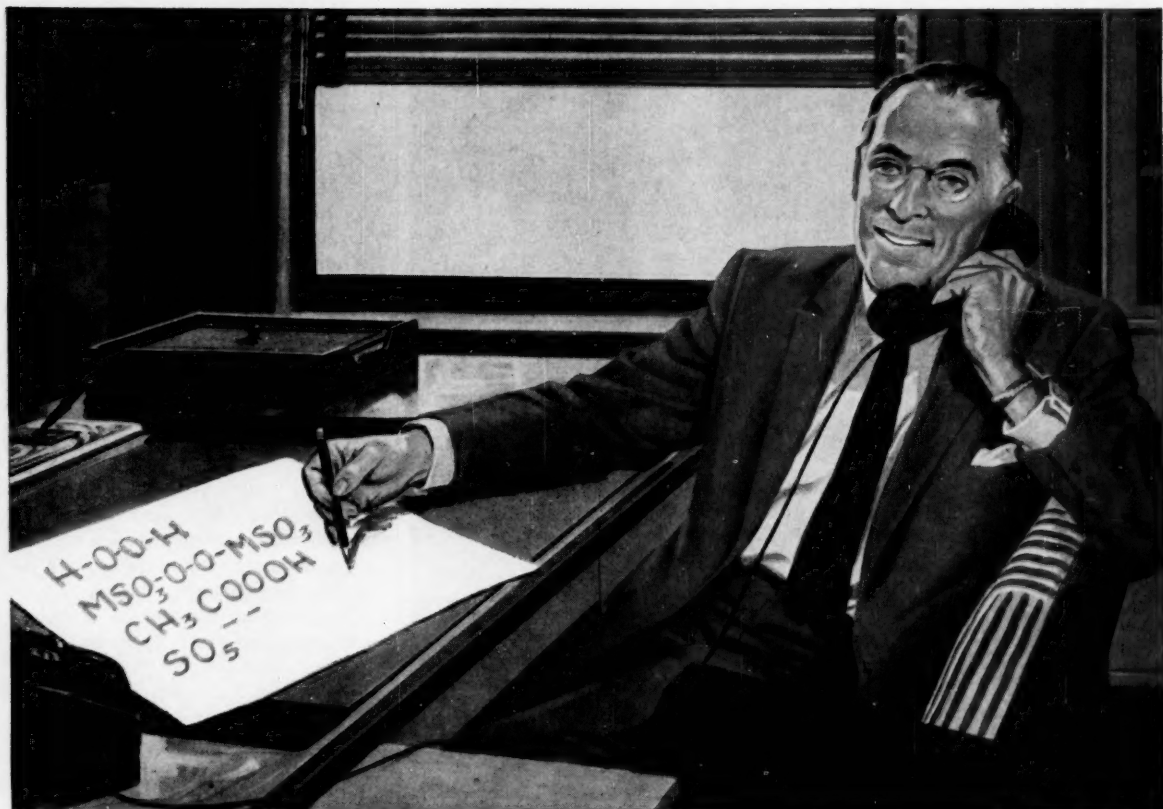
As if to lose no time, Fleming has already announced a new budget that includes reduced income taxes and considerable relaxation of the Liberal government's tight money policy.

Other policy changes that will directly or indirectly affect chemical operations in Canada include the new government's objective of curbing the dangers of monopoly, a desire to ease credit restrictions, a commitment to help small business, a plan to step up development of Canada's northern areas, a drive to insure more Canadian processing of Canadian raw materials, and establishment of a Canadian Energy Board to decide on the most effective use of energy resources.

As yet, there's no indication of the method or timing in implementing these planks of the Conservative platform. Diefenbaker's 110 supporters in the new Parliament are short of a majority in the 265-member house, but he will most likely have the support of the 25 Socialist and nine Social Credit M. P.'s in the economic and fiscal features of his program.

**Canadian Businessmen Silent:** So





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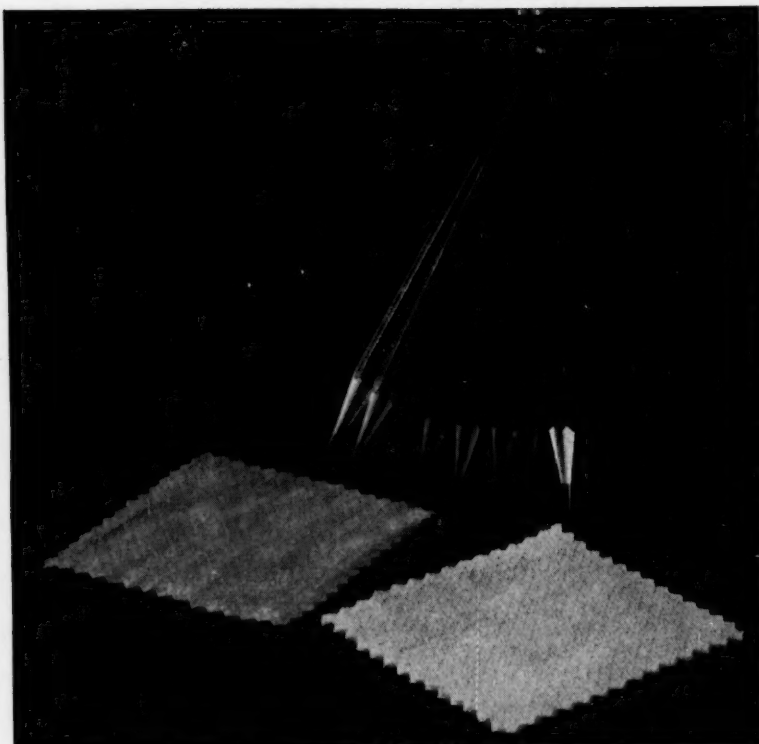
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## ADMINISTRATION

far, Canadian chemical management has been extremely cautious about expressing private views on possible policy changes. Managers of U.S. subsidiaries feel it's too early to make comments on proposed changes, and add that it's actually up to the parent company to comment when and if the changes come about. Even wholly owned Canadian firms are hesitant to comment, since, as they point out, the new government has a slender working majority in Parliament. Many feel the margin is too slim to permit sudden or dramatic changes in the status quo.

Feeling that the new government will have to go slow, at least for several months, most chemical managers are generally confident that in the immediate future, at least, there will be no startling changes.

Summing up the attitude of chemical and allied products management, General Manager C. E. Watson of OPW Paints Ltd. (Ottawa) commented, "At least for the present, I don't think the 'new deal' in Canada will bring much change to alarm chemical manufacturers here or in the U.S." But for the long view, chemical management men in Canada unanimously and politely refuse comment.

## LEGAL

**Substitution by Deception:** The U.S. Court of Appeals for the Second Circuit (New York) has enjoined a manufacturer from suggesting to druggists that its products could be substituted for those of the Upjohn Co. (Kalamazoo, Mich.), when the latter are prescribed by physicians.

The decision reversed the trial court in the case of Upjohn vs. David Schwartz, doing business as Bryant Pharmaceutical Corp. (New York).

In describing the substitution, the court said, "In ordinary commercial affairs 'substitution by deception' is wrongful, but when in the healing art there is substitution by deception, greed may reach the grade of malice."

**Paper Mills Under Fire:** With the leveling last month of pollution charges by Washington state oyster growers against Scott Paper Co.'s mill at Anacortes, the State Pollution Control Commission now has ordered five additional state pulp and paper mills to submit proposals for waste-disposal programs by Sept. 5. Seven other firms



WIDE WORLD

**GOV. ROSELLINI:** Oyster growers have turned to him for protection.

have been granted extensions to complete their proposals.

An association of some 20 major Puget Sound oyster growers protested to Gov. Albert Rosellini that the Scott mill has failed to comply with an order issued a year ago by the Pollution Control Commission directing the firm to construct an impounding basin for sulfite waste liquor. The growers charge that the wastes are destroying oysters, which once were plentiful in the area's waters.

## IDEAS

**Regular Plant Tours Scheduled:** One process plant that seems destined to be well known to townspeople and tourists alike is the Gulf Oil Corp. refinery at Port Arthur, Tex. General Manager R. C. Faulkner is setting up a regular schedule of twice-daily plant tours, with employees and their families to have first priority.

**Moves to New Location:** Executive offices of Robertshaw-Fulton Controls Co. will be moved in early fall from Greensburg, Pa., to Richmond, Va. Object: to maintain closer liason with federal government agencies and departments.

Also stated by the firm as a reason for the move was the better geographic location afforded by the Southern city, with respect to the company's Eastern plants — where manufacturing will now be concentrated.



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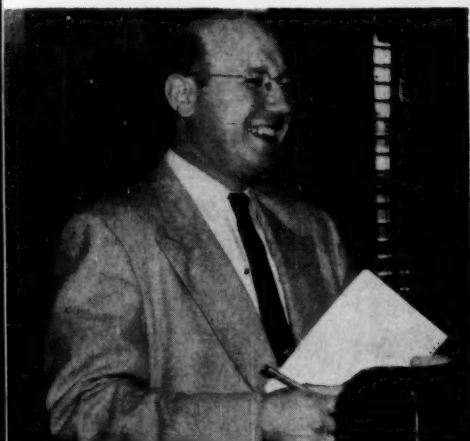


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Amann, Hall: Leaders of rival labor factions, they figure in the . . .

## New Rift in Engineer Unions

Factionalism among unionized engineers will delay a showdown over large-scale organizing of scientific and engineering employees in the chemical process industries. That was the prospect this week, following the recent secession movement that cut by about 50% the representation of Engineers & Scientists of America (CW Business Newsletter, July 13).

Heading up the attempt to establish Engineers & Scientists Guild as a rival federation with a more aggressive organizing and bargaining philosophy is electrical engineer Charles Hall. Hall is a radar specialist on leave from Sperry Gyroscope Co. He is serving as full-time president of the Engineers Assn., which represents Sperry Gyroscope's engineering employees.

**Return to ESA Foreseen:** Dismissing ESG as not destined to be more than a paper organization is Joseph Amann, who was a senior process engineer at Minneapolis-Honeywell Regulator Co. up to four years ago, when he became full-time president of ESA. Amann says his ESA "loyalist" administration plans to continue to operate the organization and to expand it; and he offers the prediction that the dissident locals eventually will come back into the ESA fold.

Still another faction within the unions-for-engineers camp is championed by Everett Taft, who preceded Hall as president of the Engineers Assn. (Sperry) and succeeded Amann

as president of the Federation of Honeywell Engineers. Taft is now president of a small and unrecognized United Auto Workers (AFL-CIO) local for Minneapolis-Honeywell engineers.

**Three Philosophies:** These three men—all graduate engineers, and all on the tender side of 40—personify the varying degrees of militant unionism in the engineering field. All three strongly assert that engineers and scientists must use collective bargaining, but with these different approaches:

- **Pure professionalism**—Amann and his supporters hold that membership in these bargaining units should be restricted (with minor exceptions) to degree-holding, professional-level engineers and scientists.

- **"Engineering family" units**—Hall and his fellow members on the ESG steering committee feel that the only practical way to form an engineering bargaining unit that's strong enough to get results is to enroll draftsmen, technical assistants and all other members of the "engineering family," as they phrase it.

- **Plant-wide solidarity**—As might be expected from his present affiliation, Taft advocates industrial unionism for engineering employees, particularly in large corporations.

**Fight for Men's Minds:** Thus the battle for engineers' minds and membership dues rages on, with ideological strife approaching the intensity of that which preceded the formation of

the American Federation of Labor some 70 years ago.

Amann contends that "engineers alone can and must become the protectors of their profession." He deplores engineer salary and personnel policies that he says are merely "doctored-up versions of the policies used for the machine shop"; and insists that if an engineering union is to come to grips with such problems, its membership cannot be divided by contrary interests.

Hall charges that ESA has neglected its collective bargaining and organizing duties, has laid emphasis instead on "an impressive front, lobbying activity, legislative machinations, and super-pure professionalism." He proposes that ESG adopt a program that would stress: moral and financial support to member units, organizing new units to broaden the base of collective bargaining, and carrying on research work to aid member units in contract negotiations.

**Trade Union Ties Urged:** On the more militant extreme, Taft denounces ESA for having "dissipated much of the emotional capital" that was available to its leadership. He gives ESG his blessing, but expresses doubt that it can become a going concern. As a new official in Walter Reuther's UAW, Taft declares: "In facing the managerial elite of our large corporations, it is not enough to have devoted leadership, engineering know-how, and collective-bargaining savvy. One must also have money, organization, and friends—real friends with roots deep in the culture of the American labor movement."

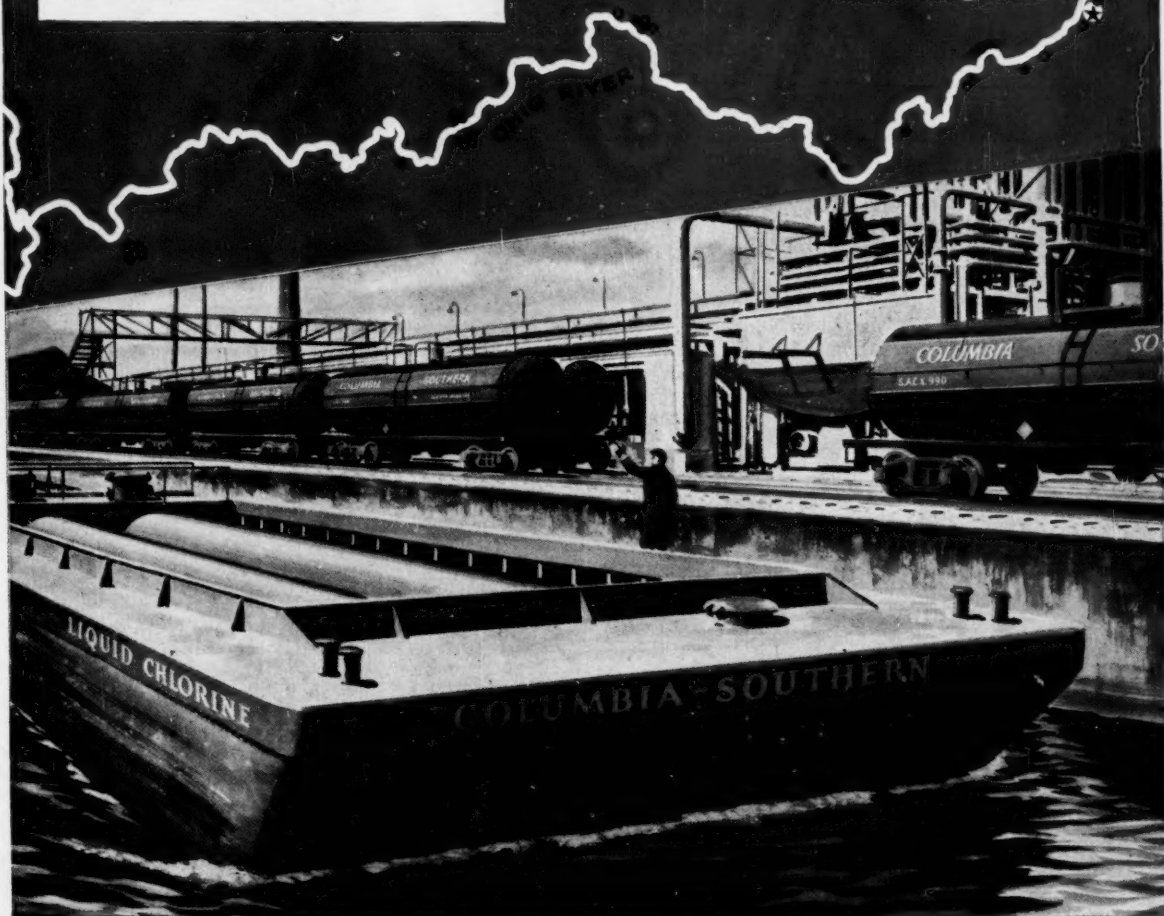
While it's conceivable that one of these approaches might find more favor among engineers now that the lines of demarcation have been clearly drawn, the greater probability is that the wrangling by these groups will tend to repel potential members.

In addition to this increased factionalism, there are still other forces braking the move to organize engineers and scientists. One is the powerful influence of the professional societies, which have castigated unionism as unprofessional. Another is the degree of success attained in some instances by "sounding-board" organizations that work for salary improvements and other economic objectives through better management-engineer communications.



This map shows the location of over 30 chemical plants now on the Ohio River including Columbia-Southern's plant at New Martinsville, West Virginia.

New Martinsville  
West Virginia



## Pioneering America's Chemical River

A multi-billion dollar array of chemical plants has sprung up—chiefly in the last decade—along the banks of the Ohio River. Initiating this chemical boom in the upper Ohio Valley was Columbia-Southern's chlorine-caustic soda plant erected in 1943 at New Martinsville, West Virginia.

Many factors influenced the choice of this site—Columbia-Southern's geological research which confirmed the presence of huge salt deposits at practicable depths; plentiful supplies of West Virginia coal; the proximity to industrial centers; and, of course, the capacity of the Ohio to carry more than twice the tonnage handled by the Panama Canal.

The presence of a successful plant in an area frequently does more than anything else to attract others. Just as Columbia-Southern's Corpus Christi plant spurred the development of the great Gulf

Coast chemical industry, so the New Martinsville plant sparked growth along the upper stretches of the Ohio. Today, from Pittsburgh to Paducah, the Ohio truly deserves the title of America's Chemical River, flowing unvexed to many markets.

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## ADMINISTRATION



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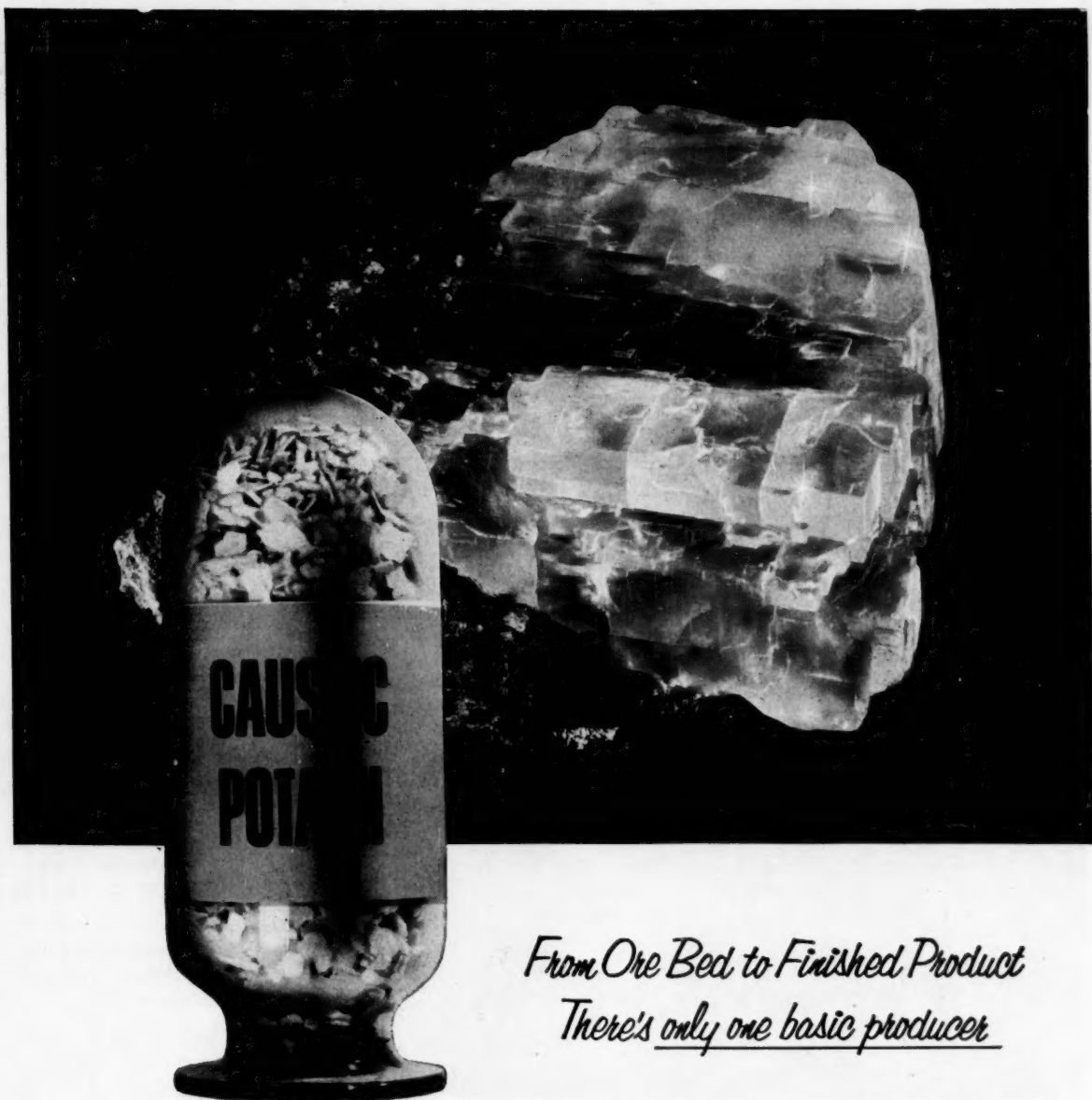
**BOILERMAKER CALVIN:** Jurisdictional strike halts chemical plant job.

## LABOR

**No Sure Refuge:** The 1954 no-raiding agreement, the 1955 AFL-CIO merger, and the 1956 construction-trades agreement still haven't produced a safe refuge from inter-union disputes. Latest instance in which a fracas of this kind has resulted in extra costs and delay to the chemical industries: a one-day jurisdictional strike by members of William Calvin's International Brotherhood of Boilermakers & Blacksmiths (AFL-CIO), halting work on construction of a \$1-million expansion job at the Pennsalt Chemicals plant at Calvert City, Ky. Picketing continued until painters completed the sand-blasting of large tanks. The Boilermakers had demanded that this work be assigned to their members, but the contractor—after hearing arguments from both unions—gave the job to the painters.

**Stiffer Unionism in Canada:** Process industry employers in Canada are encountering more aggressive unionism this summer. Examples:

- A multiplant strike has been threatened in support of a union's walkout at the Arvida smelter of Aluminum Co. of Canada. President Adrien Plourde of the National Metal Trades Federation (CCCL) warned that all nine Alcan operations in Quebec would be halted if there were no progress toward settlement of the 6,500-man strike at Arvida. The



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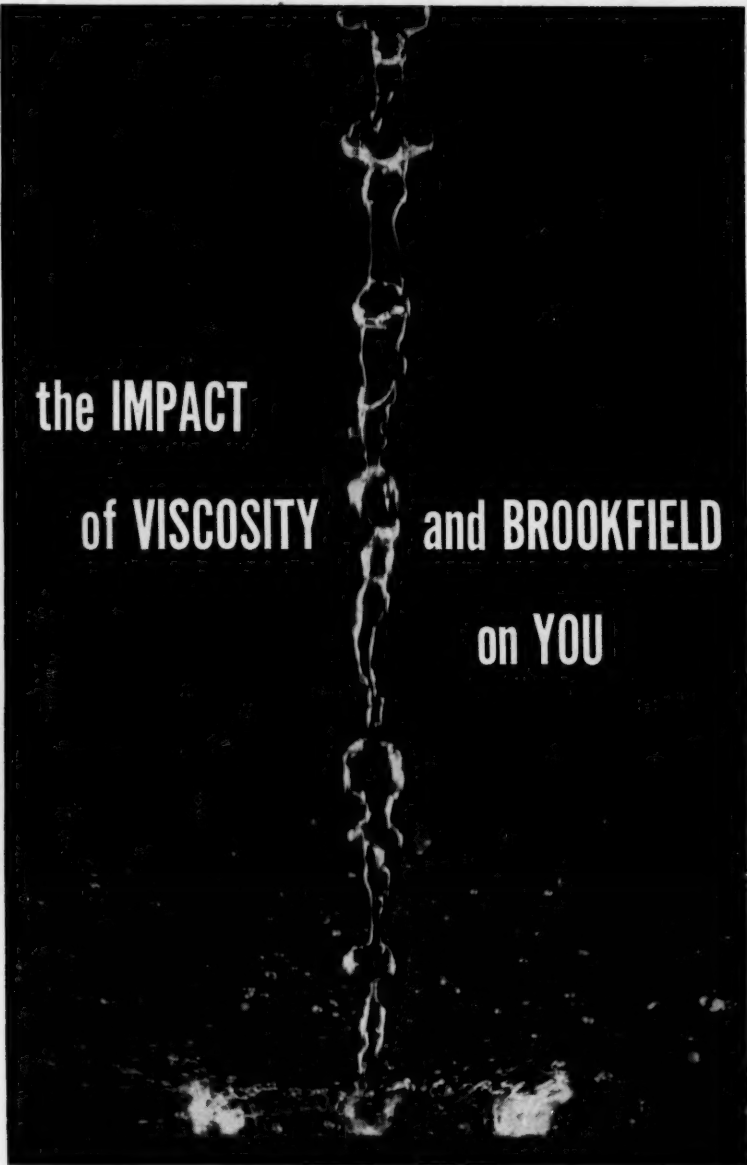
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## ADMINISTRATION

union wants a master contract for all plants in the province.

- As the International Chemical Workers Union strike at the Toronto plant of Lever Brothers Limited neared the end of its second month, the company obtained an injunction limiting to four the number of pickets at each entrance and forbidding the strikers from interfering with the passage of nonstriking employees and prospective employees.

- At Montreal, delegates from ICWU locals in Ontario and Quebec adopted a resolution calling for all provincial governments to enact legislation guaranteeing a legal work-week of 35 hours.

## KEY CHANGES

**Irb H. Fooshee**, to executive vice-president; and **James G. Fox, Jr.**, to vice-president; General Chemical Division, Allied Chemical & Dye Corp.

**T. J. Coleman**, to vice-president, Union Carbide Development Co., division of Union Carbide Corp.

**John G. Gruber, Jr.**, to vice-president in charge of production, Cook & Dunn Paint Corp. (Newark, N.J.).

**James F. Haskett**, to general manager, Water & Waste Division, Fischer & Porter Co. (Hatboro, Pa.).

**Roy Dahlstrom**, to research director; and **Charles L. Schmidt**, to technical director, Titanium Division; National Lead Co. (New York).

**Claud B. Barrett**, **Everett R. Filley**, **Theodore A. Mangelsdorf** and **James T. Wood, Jr.**, to senior vice-presidents; and **J. B. Christian**, **L. C. Kemp, Jr.** and **J. Howard Rambin, Jr.**, to vice-presidents; The Texas Co.

**John R. Gilchrist**, to administrative vice-president for organization planning and development, Tidewater Oil Co. (San Francisco).

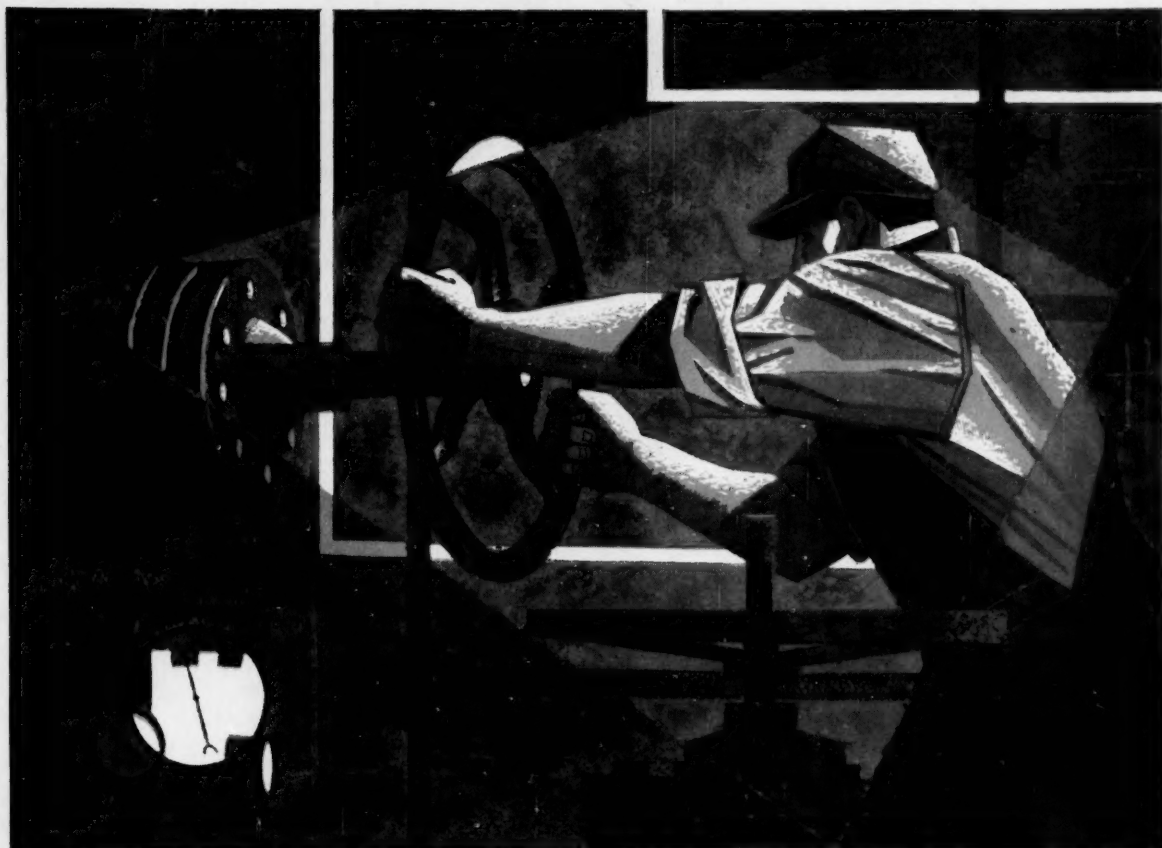
**M. Don Lyons**, to director of market research, Sun Chemical Corp. (Long Island City, N.Y.).

## RETIRED

**William S. Richardson**, president, B. F. Goodrich Co. **John L. Collyer**, board chairman and chief executive officer, has not retired as was erroneously reported in CW (*Key Changes*, July 6).

Chemical Week • July 20, 1957





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finishes, varnishes and enamels. It leaves no gummy residue to soften a finish, aids adhesion, hardens uniformly, and improves brushing, flowing and leveling characteristics. It aids in promoting surface tension control when used in aluminum paints, thereby promoting better leafing and leaf retention. 2-50-W is available for quick delivery in drums, transports or tank cars. For further information or a sample, please write to Neville Chemical Company.

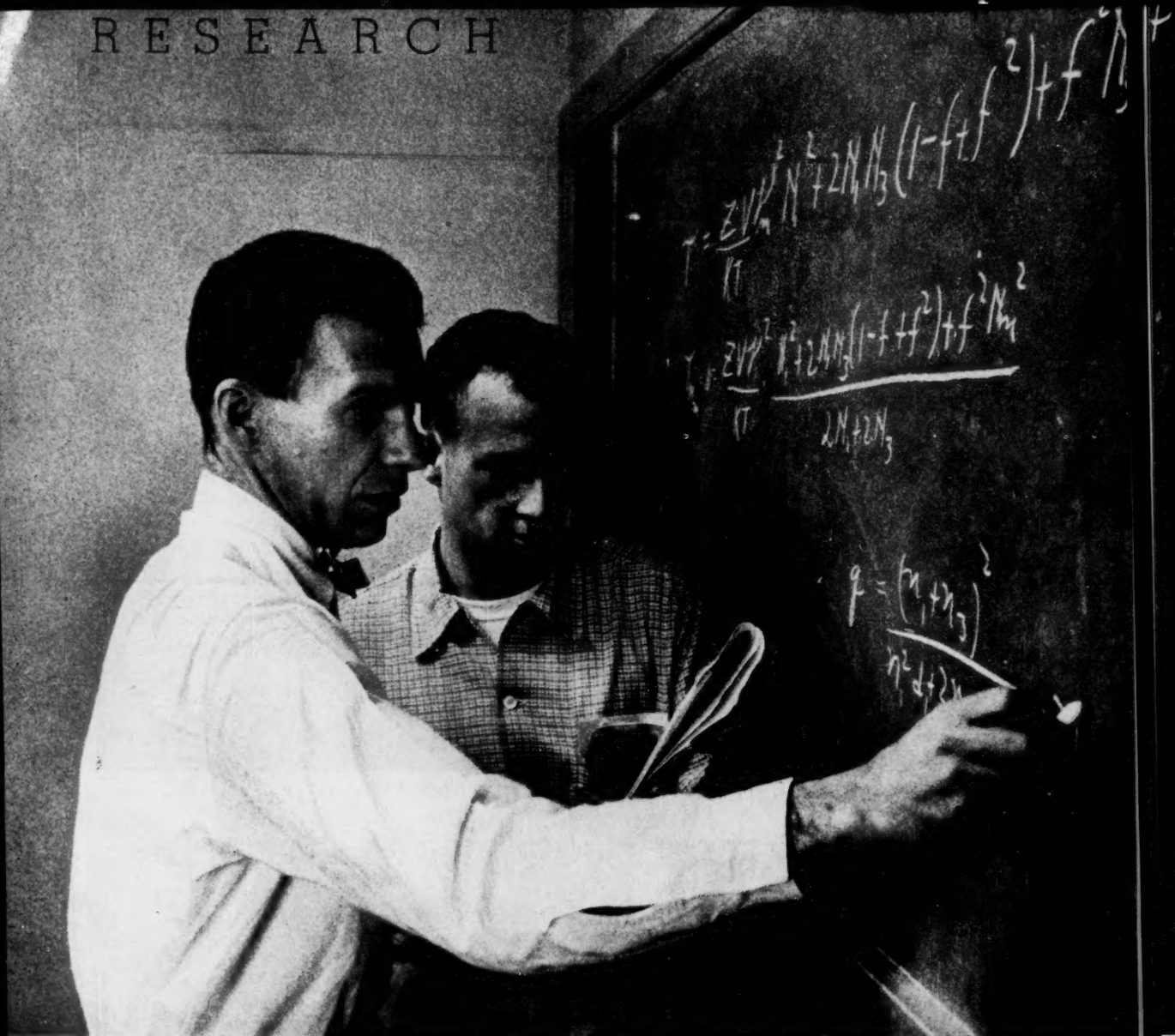
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Monsanto researcher Melvin Tuvell (left) studies at the University of Southern California under educational leave.

## Why It Pays to Send Researchers Back to the Classroom

A progress report submitted by researcher Melvin Tuvell (*above*), as the University of Southern California wound up its spring semester, gave top Monsanto executives some good reading last week.

Tuvell's report covered his activities as a researcher-on-leave in one of the oldest, most liberal programs by which chemical companies help employees to get graduate technical training—and which, of course, benefit the company through future research results, employee morale.

Eleven years ago, when Monsanto first started its program, only a sprinkling of firms had such plans. Now, with such programs becoming much more common, Monsanto's example is important as a benchmark for research management of other chemical firms.

Under Monsanto's plan, qualified technical employees are granted educational leaves for advanced study in chemistry, physics or chemical engineering at any university or college in North America. (Though such

leaves cover a nine-month school year, Tuvell, by special arrangement, will stay on this summer at U.S.C. to complete extra work.)

Each recipient (selected not on a quota basis but on individual merit) is free to elect the technical courses he feels will be of greatest personal benefit in his work. During the academic year, he receives full pay\* from Monsanto. The firm also pays transporta-

\* Of 167 companies replying when Stevens Institute of Technology surveyed employers of its graduate-level students, 68 paid 50-100% of employee educational costs.



With fellow student G. S. Bajiva, Tuvell carries out literature search.



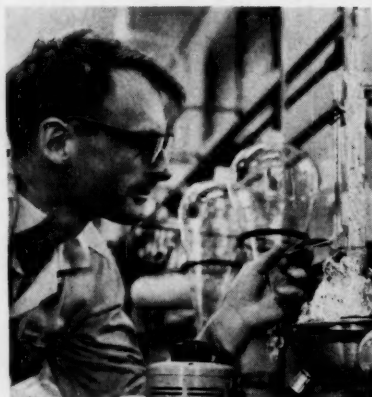
Tuvell keeps in contact with chemistry department head Charles Copeland.

PHOTOS-LEONARD WADEL  
ave program.

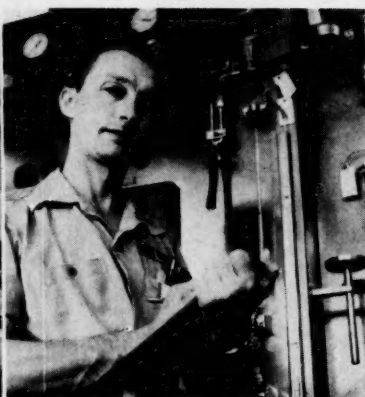
## e Campus

On campus, near statue of USC's famous Trojan warrior, Tuvell takes last-minute look at books before heading off to class.





Past participants Knowles . . .



Radue,



. . . and La Belle

tion costs for the recipient and his family to the school and back to his Monsanto job site. All other costs, including tuition and books, are paid for by the recipient.

In contrast, some companies merely guarantee no loss of seniority to employees who leave for graduate studies.

Another plan enables the employee to borrow from the company to pay his tuition. The loan is repaid by monthly payroll deductions.

**Philosophy:** To date, 35 Monsanto technical personnel—mostly from research positions—have been honored with academic leaves. Tuvell, a re-

search chemist with Monsanto's inorganic chemicals division at Everett, Mass., is among the latest. He joined Monsanto in 1947, working during summers in the company's central research laboratory at Dayton, O., until he received his B.S. in chemistry in 1950 from Ohio State. At the University of Southern California, he is specializing in colloid and physical chemistry.

Alumni of the Monsanto program have been relocated in positions equal to or better than those they occupied before taking their leaves. Although some have moved up, Monsanto does not believe this is a criterion to adjudicate the value of the academic-leave program to either the company or its sponsored students.

A. J. Pastene, assistant to Francis Curtis, who manages the program, says: "It is not the purpose of the program to train men to fill administrative positions." [Monsanto has a management development program for this purpose (*CW*, April 13, p. 47).] "Among men chosen for the academic leaves are some who seem to have greater potential as specialists than as administrators."

**Alumni Viewpoints:** Most of the beneficiaries of the Monsanto program favor the academic leaves, some with reservations.

Frank La Belle, assistant director of engineering, inorganic chemicals division (St. Louis), is one who recalls his leave with mixed feelings. La Belle, 38, earned an M. S. at MIT in 1951, was promoted to his present position in 1953. He enjoyed his stay on campus, and the opportunity to become



. . . How will Tuvell's progress compare?





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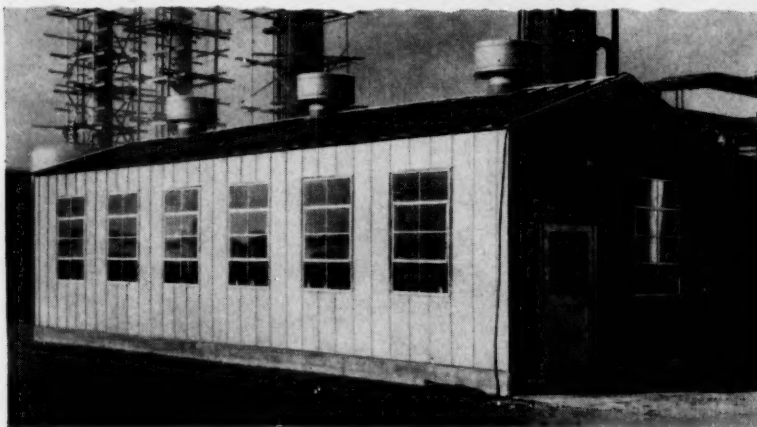
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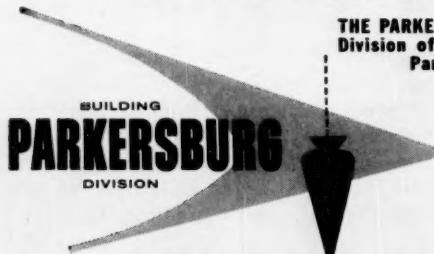
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## RESEARCH

"reacquainted with the theoretical side" of engineering problems.

But he notes that out-of-pocket expense is considerable for a family man participating in the program. La Belle's third child (of five) was born during the leave.

Like several other recipients of Monsanto academic leaves, he found it difficult to obtain adequate housing near the campus, commuted 25 miles to school.

Thirty-nine-year-old group leader Robert Radue (organic research department) took an M.S. at the University of Wisconsin in 1950, feels the leave has helped in his job. "Undoubtedly I could have picked up the resulting broader knowledge of organic chemistry on the job," he claims, "but it would have taken considerably longer and would have been more difficult."

Another organic research group leader, William Knowles, is one of three who took a leave to do post-doctorate work. He is 40 (median age for leavees is 32, the youngest was 26), married, and the father of three children. He went to Harvard to audit courses and seminars in advanced organic chemical technology, thinks more men with doctorates can benefit from such a plan "because organic chemical theory changes very rapidly."

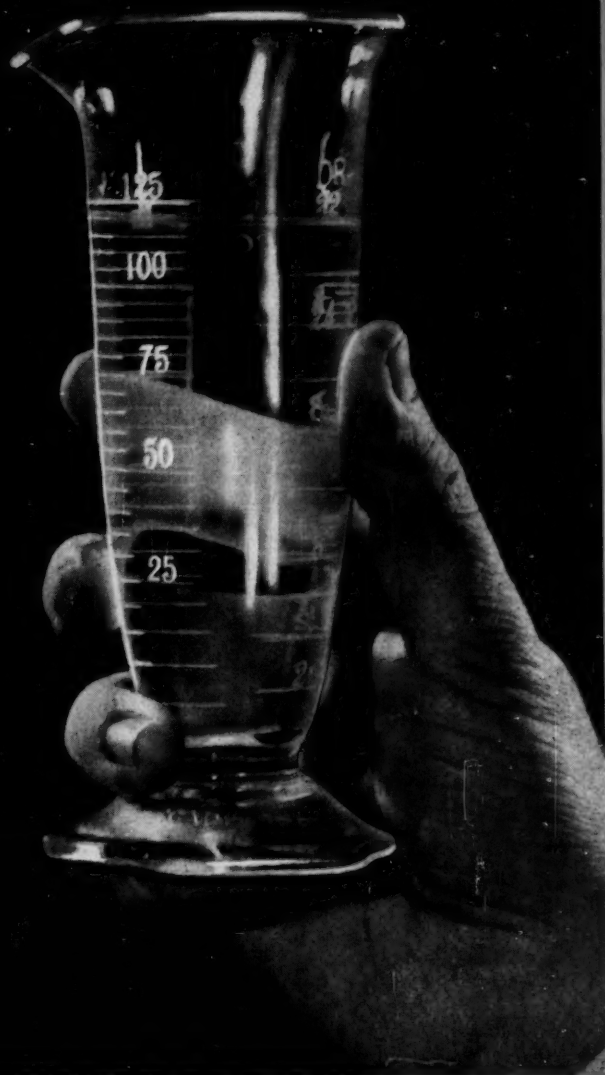
Monsanto is happy with its plan, notes that turnover among the academic-leave group is much lower than the rate of turnover of all its technical employees. The program's true value, however, may take another eleven years to ascertain fully. The company hasn't totaled up the cost of the program, feels its morale-building value alone justifies the required investment.

Meanwhile, an argument for its continuance is summed up by Harold Mohrman (research director, Monsanto's plastics division, Springfield, Mass.) in this manner:

"The academic leave, I believe, sorts out good research men, since the recipient of a leave must put something into it himself. And leaves are preferable to bringing in outside lecturers in capsulated courses. I believe that the key to success of the program is the selection of men who are sincerely interested in research as a career and who have the necessary qualifications to make a success of their careers."

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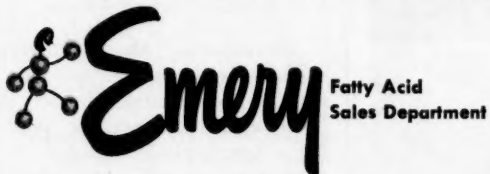
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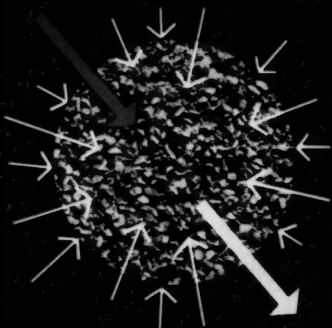
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## RESEARCH



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### Hatching Flu Serum

Pitman Moore Co., division of Allied Laboratories (Indianapolis, Ind.), has started production of one-half million cc. of "Far East" influenza vaccine for the U.S. Government.

For military purposes, the serum will be monovalent, as reported (*CW, Technology Newsletter, June 29*). A polyvalent counterpart, containing the "Far East" and other known strains, is reportedly expected for public use in the near future.

One-and-a-half eggs are needed to grow enough virus for 1 cc. of vaccine, enough to protect one person. Injected into the eggs, the virus multiplies to a high concentration, is killed with formalin, concentrated and tested.

Estimated time required before the vaccine is commercially available: 40 to 90 days (*CW, June 22, p. 38*).

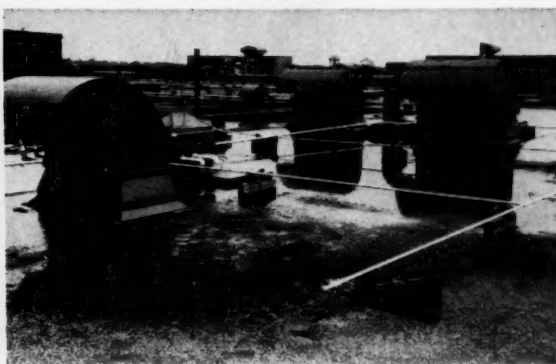
The Australian government's Commonwealth Serum Laboratories has developed and is producing a vaccine comparable to the U.S. product. Together with Canada's new polyvalent serum by Connaught Laboratories, this will ease the call on the U.S. production, allow for greater protection in America.

**Photoelectric Salts:** High-purity sulfides, selenides and tellurides for use in photoelectric cells and phosphorescent tubes may be produced by a new method developed by Siemens-Reinigerwerke AG. (Erlangen, Germany). The elemental material to be reduced (e.g., sulfur) is first

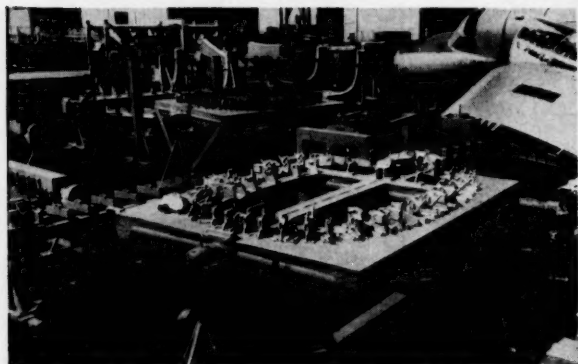




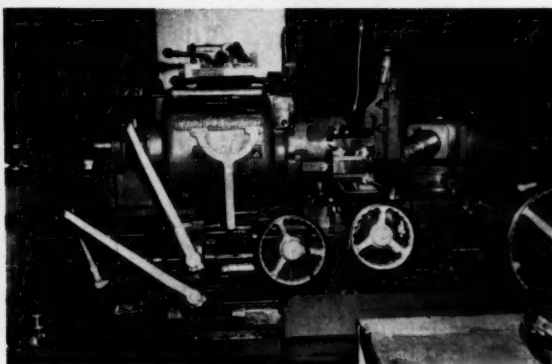
**Coating for wood block floor** has shown excellent resistance to abrasion, spilled oils and greases, and the rough traffic of heavy carts. This coating, based on BAKELITE Vinyl Resins, has provided dependable protection for over two years.



**Side by side comparison.** The exhaust hood on the left, coated with a paint based on BAKELITE Vinyl Resins, is in excellent condition after 14 months exposure to fumes and weather. The two hoods to the right, painted with conventional material, already show signs of failure.



**Safe outdoor storage** for machinery, jigs and fixtures at the Grumman Plant is provided at a time saving of 75% compared with previous methods. A wash primer and vinyl top coat for permanently coated portions is used. For machined parts of the jigs and fixtures an easily removable, strippable coating based on BAKELITE Vinyl Resins is used. Excellent resistance to weathering maintains top notch protection.



**Cuts machinery repainting.** Formerly, grinding and milling machines at Grumman had to be painted frequently due to the abrasive effect of splashing milling oils and metal chips on the enamel. Now, with a tough coating based on BAKELITE Vinyl Resins, only occasional retouching is required for those spots subject to hardest wear.

Coatings described on this page are formulated by Carroll Products, Inc., Farmingdale, N. Y.



*At Grumman Aircraft Plant*

## special coatings do many jobs

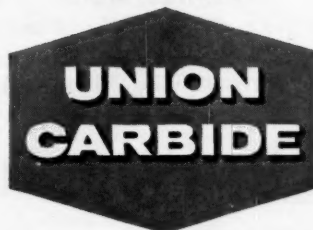
More and more, corrosion and maintenance problems in industry require coatings that are custom formulated for specific jobs. At Grumman Aircraft Engineering Corp., Bethpage, N. Y., a variety of coatings based on BAKELITE Brand Vinyl Resins are used for machinery, floors, air conditioning units, exhaust stacks from paint tunnels, pipes, tanks, outdoor storage of jigs and fixtures . . . as strippable coatings for lining paint spray rooms and for masking parts before electroplating or hard-coat baths.

For further information on chemically-resistant, long-wearing coatings made with BAKELITE Resins, write Dept. YK-34 for our booklet, "BAKELITE Resin Coatings for the Chemical Industry."

**BAKELITE Brand Vinyl, Phenolic, Polyethylene, Epoxy and Styrene Resins for Coatings**

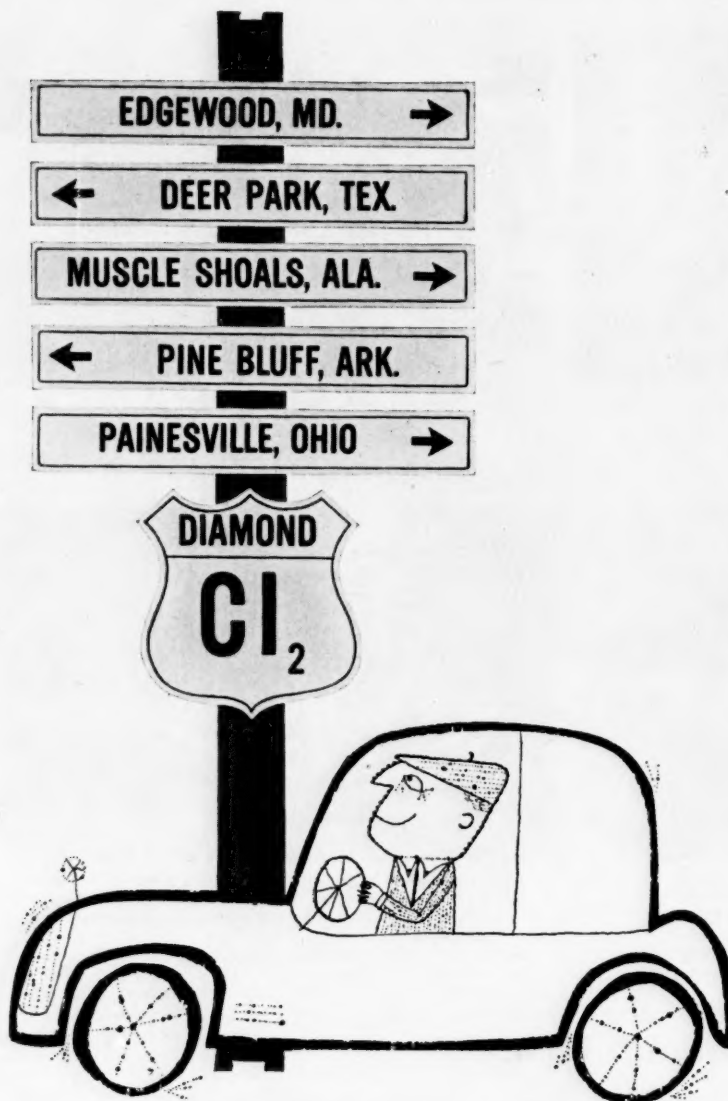
IT PAYS TO SPECIFY COATINGS MADE WITH

**BAKELITE**  
BRAND  
**RESINS**



**BAKELITE COMPANY**, Division of Union Carbide Corporation  30 East 42nd Street, New York 17, N. Y.

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## RESEARCH

heated with aluminum powder in aqueous ammonia under a nitrogen atmosphere. The resulting ammonium compound is then added to a salt of the desired metal (e.g., cadmium, zinc) in solution to precipitate the phosphor. The process eliminates the necessity of purifying the raw materials used, precipitates objectionable impurities, or causes them to be deposited on the aluminum powder. Siemens-Reiniger reports 95-100% yields of zinc and cadmium sulfides, selenides and tellurides by this analytical method.

**To speed analysis** of metallic samples, researchers at U.S. Steel's Monroeville, Pa., laboratories have come up with a simplified method of preparing spectrograph electrodes. It's called the "carbon-matrix technique," consists of placing a small amount of sample and a known amount of germanium into a crater drilled in the end of graphite electrode.

The graphite serves as a diluent for the sample; the germanium provides a reference intensity in the spectrum. The new method eliminates the need for checking each sample against a series of standard metallic mixtures in the electrode tip.

## PRODUCTS

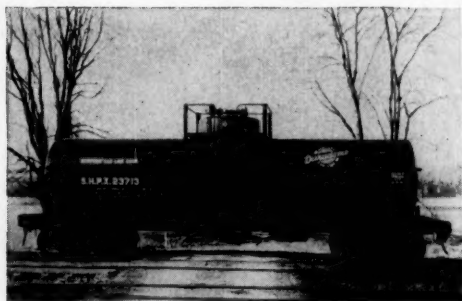
**Plasticizer Intermediate:** A new form of hydroxypropylglycerine, named Hyprin GP 25, is offered by Dow Chemical Co. (Midland, Mich.). It features absence of polymeric propylene oxide, is said to show promise as a cellophane and phenol-formaldehyde resin plasticizer and in making alkyd resins and polyesters. Initial studies indicate that Hyprin GP 25 is suitable for use in food-packaging materials and food products.

**Arthritis Controller:** Lederle Laboratories (Pearl River, N. Y.) has unveiled a new cortisone derivative called triamcinolone, said to have antirheumatic properties. The drug is said to reduce side-effects associated with cortisone treatment.

**Gallium Offering:** Gallium in "99.999%+ purity" is a new offering of United Mineral & Chemical Corp. (New York) for research in semiconductive, photoconductive and lumines-



## Red-hot recipe for tougher tank cars



Typical DURADOME—designed for formaldehyde service



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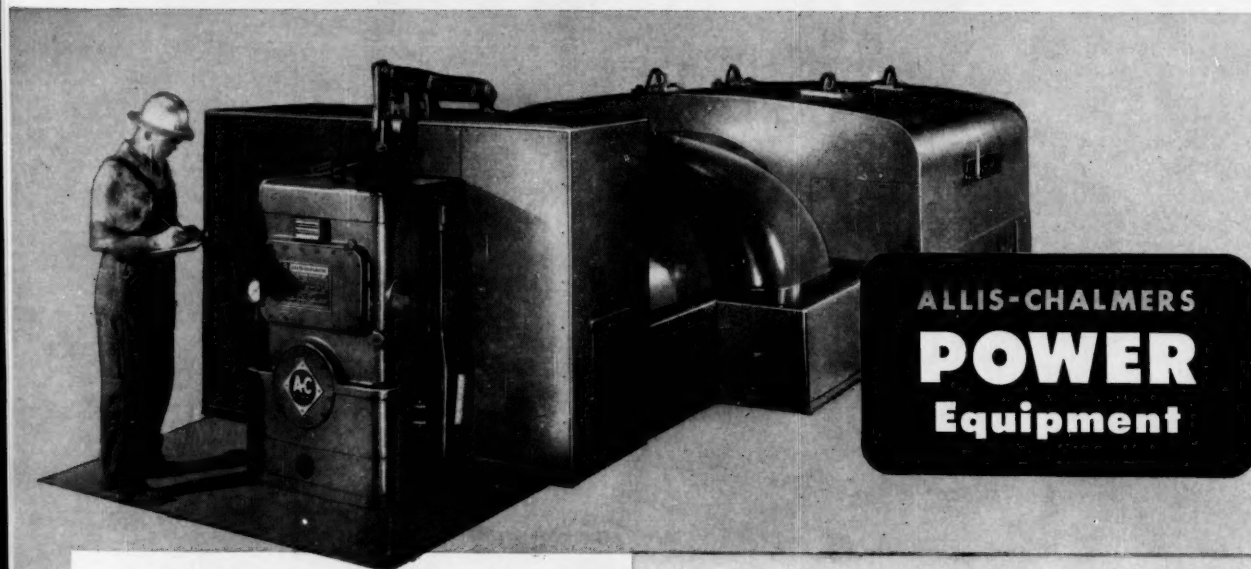
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Division of ACF INDUSTRIES, Incorporated  
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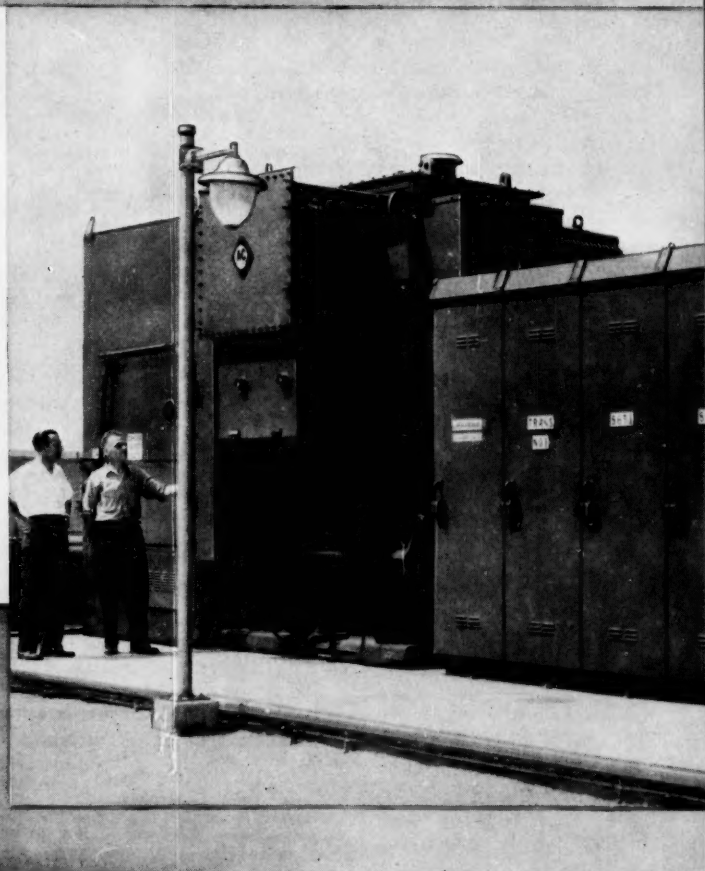
# "Coordineered" for



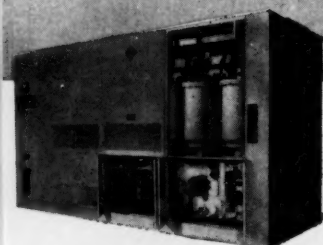
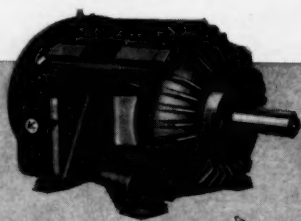
**Generation** — *Steam Turbine-Generator Units* — Built in 2000-kw and larger sizes. Allis-Chalmers also makes *condensers, pumps, voltage control and motors* in types and sizes to meet any power plant operating conditions.

**Distribution** — *Unit Substations* — In the substation illustrated, Allis-Chalmers switchgear and transformers are combined to provide dependable power distribution. *Dry-Type Transformers* — Available in a wide range of sizes and designs.

**Utilization** — *Motors* — Standard and special motors for practically every purpose and in any capacity range. Allis-Chalmers offers a complete line of *motor control and mercury arc rectifiers* in ratings to fit practically any requirement.



Motors



Control



Mercury Arc Rectifiers



# ALLIS-

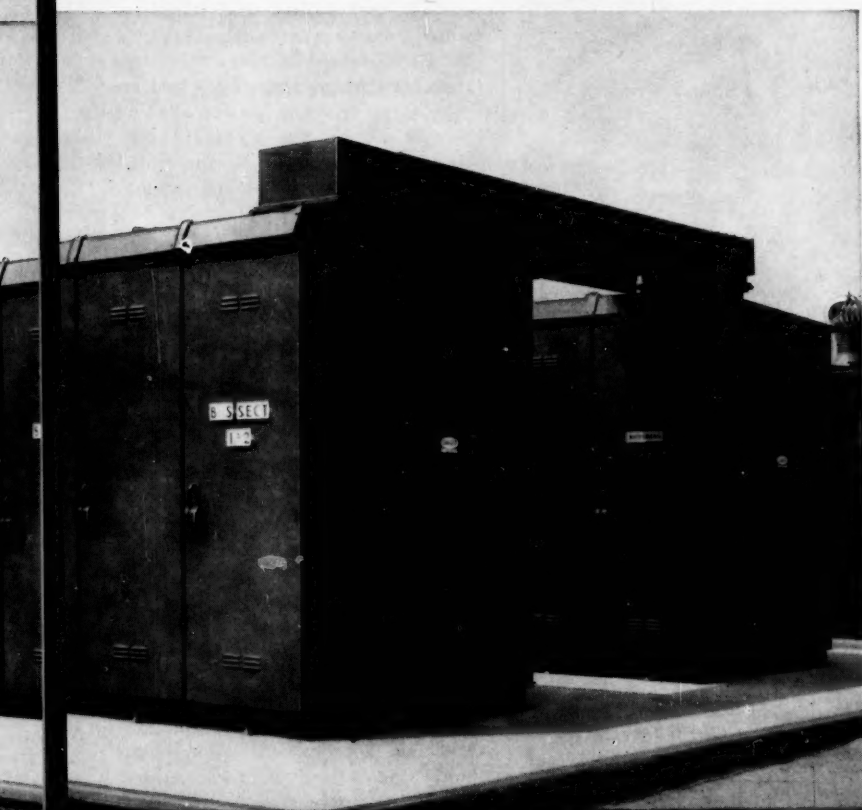


# System Efficiency

## Undivided Responsibility for Power Generation, Distribution and Utilization

Efficient system performance requires more than good equipment. It encompasses overall *system* design... equipment for generation, distribution and utilization integrated to operate effectively within predetermined requirements. As a manufacturer of a widely diversified line of electrical equipment, Allis-Chalmers maintains a separate department for each product. Each product department is staffed by research, design, manufacturing and application specialists. "Coordineering" results from an interdepartmental exchange of technical information, correlated in *one* department specializing in a particular industry application.

Allis-Chalmers, as a *single source* for a highly integrated power system, offers *single responsibility* for overall system performance.



## Allis-Chalmers Builds the Following "Coordineered" Equipment:

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PLANT	2	Compacting Mills Roller Mills Screens
PYRO-PROCESSING	3	Furnaces Kilns Coolers Dryers
POWER	4	Turbine-Generators Condensers Pumps Transformers Switchgear Unit Substations Motors V-Belt Drives Control Rectifiers
LIQUID HANDLING	5	A complete line of Centrifugal Pumps
AIR & GAS HANDLING	6	Centrifugal Blowers Axial Compressors Rotary and Barrel-Type Compressors and Vacuum Pumps

Allis-Chalmers also makes equipment for solvent extraction, electronic heating, metal detection and inter-floor conveying.

Bulletin 25C6177 covers all Allis-Chalmers equipment for the process industries. Bulletins on specific equipment lines are also available. See your Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wisconsin.

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PLANT: 9901 N. HURST AVE., PORTLAND, OREGON  
GENERAL OFFICES: 1485 BAYSHORE BLVD., ROOM 201, SAN FRANCISCO 24, CALIF.

## RESEARCH

cent materials. It's made by Aluminum-Industry AG. (Switzerland), by a recently patented process.

**Organic Alternates:** Dimethyl acetal is newly available from Aceto Chemical Co. (Flushing, N. Y.) as a substitute for methyl vinyl ketone, etc. It is also a source of acetaldehyde *in situ*. Aceto offers samples, data, complete description and suggested uses of the product, which is made by British Industrial Solvents of England. Aceto represents that firm in the U. S.

## EXPANSION

• Wm. S. Merrell Co., Cincinnati pharmaceutical manufacturer, plans to build an organic chemistry research laboratory in Reading, O., as part of a \$1-million expansion program.

• Hooker Electrochemical Co.'s (Buffalo, N. Y.) president, Bjarne Klaussen, says the firm hopes to start construction of its Grand Island research laboratory next fall. Plans for the \$2.5-3-million laboratory, first revealed last August, have been held up because of delays in getting working permits and because of water intake and discharge problems complicated by the Niagara's being an international waterway.

• Clinton Corn Processing Co. (Clinton, Iowa), a division of Standard Brands, Inc., has opened a new \$1-million research center for studies in starch sizing, fermentation production of pharmaceuticals, etc.

## REPORTS

This new report is available from the U. S. Dept. of Commerce, Office of Technical Services (Washington 25, D. C.):

• "Preparation of Fluorine-Containing Compounds" (PB 121818, 75¢) covers a project to prepare new fluorine-containing compounds by the Simon electrochemical process, study the properties of resulting materials. Included in the project: preparation of simple fluorocarbon sulfides with fluorocarbon olefins; fluorocarbon derivatives having hetero-atoms such as oxygen or nitrogen in the principal carbon chain of the molecule; perfluoroamides (a new and unexplored class of compounds); and intermediates in the preparation of the difunctional acid  $O(CF_2COOH)_2$ .

# U.S.I. CHEMICAL NEWS

July 20

★

A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries

★

1957

## Shredded Polyethylene Protects Electronic Brains

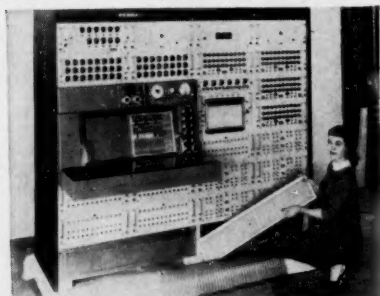
Special Form Supplied by U.S.I.

A self-charging electrostatic air cleaner, made of shredded polyethylene encased in a metal holder, protects the Goodyear Electronic Differential Analyzer (GEDA) from air-borne particles.

Shredded to present a large surface area to the air stream and to cause pronounced turbulence, the polyethylene generates an electrostatic charge which captures and holds dust, smoke and even pollen. Thus the air needed for ventilation in the electronic brain is free from the extraneous particles which might otherwise harm sensitive circuits.

These filters withstand air temperatures up to 212°F and are inert to chemicals normally encountered in industrial atmospheres. A special U.S.I. PETROTHENE® polyethylene resin is used, and is supplied in a form ready to be shredded instead of in the usual pellet form.

This particular polyethylene application is an example of how U.S.I.'s policy of tailor-making resins works in practice.



Secretary holds one of self-charging electrostatic air cleaners which protects analyzer.

## Radiation Causes Decrease In Ability of Body to Absorb Methionine

New research indicates that the ability of experimental animals to make use of the essential sulfur amino acid, methionine, is impaired when the methionine is administered after exposure to radiation.

In the experiments, radiation from an X-ray source impaired the motor function of the digestive tract, causing delay in emptying the stomach and an increased rate of progression through the digestive tract. The progress of the methionine in the digestive tract of both the experimental and control animals was determined by tracer technique using methionine containing radioactive sulfur ( $S^{35}$ ). Delayed absorption of methionine into the damaged tissues is thought to aggravate the digestive malfunctioning.

Previous research has shown that methionine given before exposure is effective in protecting against tissue damage caused by radiation. (U.S.I. CHEMICAL NEWS, Sept.-Oct., 1955.) These new findings indicate that methionine's action is largely protective rather than curative.

## New Products, Packages Made 1956 Aerosol Industry's Biggest Year

Aerosol Hair Lacquers Become Sales Leader, CSMA Figures Show; New Glass and Plastic Aerosols Aided Industry's Growth

Results of the annual survey of the aerosol industry by the Chemical Specialties Manufacturers' Assn. show that 1956 was the biggest year yet for the 10-year-old industry. Unit sales were 320 million units, an increase of 33% over 1955, and 73% more than the 185 million units turned out in 1954.

### U.S.I. Offers New Brochure On Zirconium and Hafnium

A new technical brochure which describes application and fabricating techniques for zirconium and hafnium has just been published by U.S.I.

In 12 pages, "Zirconium and Hafnium" provides technically minded readers with up-to-date information on properties, fabrication and uses in the nuclear and chemical processing industries. The brochure may be obtained by writing to U.S.I. at 99 Park Avenue, N. Y.

### New Dibasic Acid Yields Water-White, Monomeric, Low-Temp Plasticizer

Hazen color tests on three monomeric, low-temperature vinyl plasticizers made with three different aliphatic dibasic acids and the same alcohol reveal that "U.S.I. ISOSEBACIC"® acid imparts by far the least color. A plasticizer made from synthetically produced ISOSEBACIC acid gave the low color reading of 150. Plasticizers made from the other dibasic acids, both derived from vegetable or animal oils, showed higher color. One gave a reading of 175 and the other was so dark as to be beyond the Hazen color scale.

"U.S.I. ISOSEBACIC" acid, a unique synthetic acid mixture of three  $C_{10}$  dibasic acids (2-ethyl suberic acid, 2,5-diethyl adipic acid and sebacic acid), not only permits production of esters of very light color, but also imparts to end products excellent low temperature flexibility and non-volatility characteristics expected of a material of this chain length. Isosebacate esters can be made at much lower cost than the corresponding normal sebacate esters.

"U.S.I. ISOSEBACIC" acid also shows promise as an intermediate for polyurethanes, nylon, polyesters, and high-temperature jet lubricants.

### Sodium Dispersions Can Now Be Made Continuously

A new process for the continuous production of sodium dispersions has been developed and tested by the U.S.I. Research Department. For many processes, continuous preparation can provide higher production rates than conventional batch preparation.

Contributing to the upswing was the sharp sales rise of aerosol hair sprays. A relative newcomer to the field, hair sprays have even outdistanced insecticides in the race for top sales spot.

In the category of "Hair Lacquers", CSMA reported 1956 sales of nearly 80 million units. This figure is 25% of total sales for the industry.

Indications of the forward strides made by aerosols in the hair spray field had been apparent for some time; the Alcohol and Tobacco Tax Division of the Internal Revenue Dept. reported that last year 2,541,000 wine-gallons of alcohol went into hair and scalp preparations. This compares with 1,682,000 gallons for 1955, an increase of 51%.

While much of this alcohol went into hair and scalp preparations other than aerosol-packaged sprays and lacquers, it had been evident to industry observers that the aerosol market accounted for the bigger share of the gain.

### New Packages Big Sales Factor

Influencing the upsurge in aerosol sales are such comparatively recent packaging innovations as the glass aerosol. Shampoos, perfumes, colognes, deodorants, suntan oil and other toilet preparations are now available in packages that combine the eye appeal of transparency with the convenience of the pushbutton dispenser.

In many cases, the desired safety factor is achieved by encasing the glass container in an attractive outer container molded of polyethylene. This plastic is also used almost exclusively for aerosol valves.

Thus, two U.S.I. products, ethyl alcohol and polyethylene, have played an important role in the phenomenal growth of the aerosol in-

MORE



A variety of container designs has helped build the aerosol industry to its present strength.

MORE







# Technology

## Newsletter

CHEMICAL WEEK

July 20, 1957

**A newly developed process** for making reactor-grade hafnium and zirconium uses a mixture of sodium and magnesium for reducing metallic chlorides.

The most important plus for the process, developed by the Bureau of Mines at Albany, Ore., is that it turns out a hafnium that can be used in reactors without any further processing. It does the same for zirconium, but so do other processes. At present, however, all the hafnium sponge produced in this country has to be purified by iodide dissociation to remove such impurities as silicon, aluminum, magnesium, oxygen and nitrogen.

**The new process is essentially a modified Kroll reduction** of the tetrachloride, using the mixture of sodium and magnesium. The bureau feels the success of the process is due to a newly developed operating technique: sodium (liquid) and magnesium are charged to the reactor and the temperature raised to 725-759 C. This temperature is maintained there until all the sodium is consumed (magnesium doesn't take part in this reaction at this point). Then the temperature is raised to 850 C, where the magnesium finishes the reduction.

In this way, a eutectic chloride salt is produced that has a lower melting point (650 C) than that formed during straight magnesium reduction (magnesium chloride melts at 712 C). Result: during distillation, practically all of the salt formed melts and drains out of the reactor.

**Why are there less residual impurities in the sponge?** No one knows quite why, although bureau workers have several theories to explain it. But since the reaction is carried out at lower temperatures and at a more uniform reaction rate than is the straight magnesium reduction, fewer impurities (e.g., iron, chromium) are picked up from the crucible. The bureau claims that the product made by this process is better than that made by present reduction and separation techniques. It has made a metal having a Brinell hardness of 200, compared to 240 for present metals.

So far, the bureau has been making 40-lb. batches of hafnium, 28-lb. batches of zirconium. In scale-up operations now under way, it expects to be making 184-lb. batches of hafnium.

The go-ahead to make the Asiatic flu vaccine has been received by the drug industry. Last week, the National Institutes of Health's division of biological control issued standards for manufacturing it to the six firms that make most of the vaccines in this country (Merck's Sharp & Dohme Division, Parke, Davis, Eli Lilly, Lederle, National Drug and Pitman Moore). Sharp & Dohme immediately announced that it had begun large-scale production.

## Technology Newsletter

(Continued)

The NIH specifications permit substitution of killed virus of the Asiatic flu-strain for killed virus of the less-prevalent B-type flu that is now used in making polyvalent vaccines. So far, no one has submitted any vaccine to NIH for release—even though experiment batches are being tested on military and civilian volunteers near Montgomery, Ala.

Sharp & Dohme, of course, is confident that it can meet the NIH specs. All six firms, in fact, have been hard at work on the vaccine for some time (*CW*, June 22, p. 38).

•  
**Discovery of element 102**—newest of the man-made transuranics—was reported last week by a team of scientists from AEC's Argonne National Laboratory, Britain's Atomic Energy Research Establishment (Harwell) and Sweden's Nobel Institute for Physics (Stockholm). The new element was produced by bombarding curium (element 96) with nuclei of carbon-13.

Rare isotopes of curium-244 were separated from spent uranium reactor fuel and supplied by Argonne; Harwell provided the carbon-13; Nobel Institute provided the cyclotron needed to accelerate the particles to sufficiently high energy levels. Identification of the new element was made by radiochemical analysis of its nuclear properties (half-life of 10-12 minutes, radioactive decay by alpha-particle emission). Suggested name for element 102: Nobelium.

•  
**Practical applications of high-energy irradiation** will be developed by Dow Chemical's Texas Division. It has installed a 1-million-volt G. E. electron-beam generator at the W. R. Veazey Research Center. With the help of electrons traveling at velocities in excess of nine-tenths the speed of light, Dow's organic basic research laboratory will explore the chemistry of polymerization and vapor-phase reactions.

•  
**A method of transforming gasoline into a solid** is claimed by the Russian Academy of Science in Pala. Although processing details haven't been disclosed, it's reported that gasoline bricks are produced by mixing normal-octane gasoline with plastic compounds in specially designed equipment, solidifying the mixture under heat and pressure. The bricks are said to be resistant to heat, rain. They reportedly can be stored under water without loss of gasoline content.

•  
**A new synthesis of acetyl and butyryl thiocholine iodides** has been developed by Australian researchers. The substances are used to differentiate true from pseudo cholinesterase.

In the new synthesis, dimethyl-aminoethanethiol is acylated with the proper acid anhydride and, without isolation, the product is quaternized in acetone. Advantages: appreciably higher yields, greater ease of use than present processes offer.



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And just recently, came "Dutch Boy" Stabilizer Lector "60,"® unique for water

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**Helping other industries, too**

"Dutch Boy" Stabilizer research is also stepping up quality in vinyl flooring, organosols, plastisols, profile extrusions, film and sheeting.

At the same time, "Dutch Boy" research in thixotropic gelling agents (BENTONE®S and BEN-A-GEL®) is helping the paint, oil, ink, and other industries improve body and flow characteristics of their products.

Mail the coupon for details on the "Dutch Boy" Chemicals mentioned above. For technical assistance in their application, write.

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## **New route to titanium tetrachloride**

**It starts with conventional processing steps . . .**

- Digest ore in sulfuric acid and remove iron as ferrous sulfate.

## **Three new operations hold the key**

- Saturate titanium sulfate solution with hydrogen chloride at 0 C.
- Add solid potassium chloride to precipitate selectively potassium chlorotitanate.
- Decompose the chlorotitanate at 300-500 C to recover pure titanium tetrachloride.

## **Cold Chlorination: Key to Low-Cost $\text{TiCl}_4$**

**Newest applicant** for the job of turning low-grade titanium slag and ilmenite into low-cost titanium tetrachloride is a cold chlorination process developed by the Armour Research Foundation of Illinois Institute of Technology (Chicago). Key: use of hydrogen chloride at low temperature to bypass troublesome corrosion problems encountered in high-temperature chlorination with costlier chlorine.

The cold chlorination isn't exactly a new idea—it first occurred to ARF's Frederic Schossberger about 17 years ago while he was engaged in pigment production in Europe. But it took several years' work at ARF to transform the idea into a commercially feasible process. Here's how it works:

Low-grade titanium-bearing material, such as ilmenite or slag, is first treated through a series of operations conventional to the production of pigments. These include: digestion in sulfuric acid, filtration of undissolved sludge and removal of iron

as ferrous sulfate by crystallization at -5 C.

ARF's new twist begins with the treatment of the iron-free solution of titanium sulfate. The solution is chlorinated by saturation with  $\text{HCl}$ , treated with solid potassium chloride to precipitate titanium as potassium chlorotitanate ( $\text{K}_2\text{TiCl}_6$ ). The complex yellow salt, which ties up titanium as a complex anion ( $\text{TiCl}_6^-$ ), is stable, dissolves in water without hydrolysis. The precipitate is separated from the mother liquor by filtration.

Titanium tetrachloride is recovered by subjecting the chlorotitanate to heat above its decomposition temperature (300-500 C).  $\text{TiCl}_4$  is collected in a condenser; potassium chloride regenerated by decomposition is recycled to the precipitation stage. Over-all yield of  $\text{TiCl}_4$  is about 85%.

Advantages of cold chlorination, says ARF, include:

- Lower costs.—low-grade ores or

other titanium-bearing materials are cheaper than high-grade rutile;  $\text{HCl}$  replaces costlier chlorine.

- Simple operation—low operating temperature of the chlorination and decomposition stages permits substantial savings in the cost of equipment, its replacement and maintenance.

- Purer product—selectivity of the chlorination-crystallization step yields  $\text{TiCl}_4$  of higher purity.

**Unanswered Questions:** Though chlorination has yet to be proved in pilot operation, ARF believes that the only apparent problems likely to be encountered in a large-scale operation are definitely solvable. For one thing, there's the problem of disposing of by-product ferrous sulfate. ARF is still working on this nuisance, points out that the pigment industry has managed to tolerate the condition.

From the engineering standpoint, the cold chlorination process will call for some corrosion precautions, but should be less critical in this respect



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*SERVING THE GAS, PETROLEUM, CHEMICAL, PETROCHEMICAL,  
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NEEDS OF INDUSTRY AND CORPORATE UTILITIES.*

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AIR TREATING EQUIPMENT

than conventional processes employing chlorine at high temperature. Design of filtration equipment to recover the chlorotitanate may be somewhat difficult, since the precipitate is likely to be very fine and, therefore, hard to filter. But this problem isn't insurmountable, says Schossberger, can be licked by proper engineering according to ARF's directions.

**Process Economics:** Barring unforeseeable complications, ARF estimates that a 15,000-tons/year plant could produce titanium tetrachloride at a processing cost of 3.76¢/lb. (see cost breakdown in table). This is exclusive of costs for raw materials (18,700 tons of ilmenite; 22,400 tons of  $H_2SO_4$ ; 16,500 tons of  $HCl$ ) that vary over a considerable range depending on plant location.

The greatest savings, of course, come from the utilization of low-grade starting materials. Imported Australian rutile runs about 95%  $TiO_2$ , reportedly sells for about \$210/ton. Ilmenite, on the other hand,

assays at only 40-60%  $TiO_2$ , sells for about \$25/ton.

This price differential has sparked the development of several other processes aimed at greater utilization of large domestic ilmenite supplies and readily available titanium slags (*CW Technology Newsletter*, Aug. 11, '56). Du Pont introduced a direct, fluid-bed chlorination technique (*CW*, March 19, '55, p. 84) adaptable to ilmenite or slag. By its patented process (U.S. 2,701,179 and 2,701,180), Du Pont produced a mixture of  $TiCl_4$  and  $FeCl_3$  which had to be separated after condensation.

Stauffer, too, employs a fluid-bed process based on a patent (U.S. 2,486,912) granted to Arnold Belchetz. And though both of its plants—at Ashtabula, O., and at Niagara Falls—make the tetrachloride from rutile, Stauffer has a long-standing interest in low-grade sources of titanium, may switch eventually to Sorel slag (*CW Technology Newsletter*, Nov. 10, '56).

**Pilot Push:** ARF has filed patent

applications on cold chlorination, feels that it's now up to the industry to join in the commercial development. All that's needed now, says Schossberger, is some additional research on a pilot scale. If it lives up to its advance notices, cold chlorination may be the key that will open the door to titanium from plentiful, low-grade domestic raw materials.

## Nickel from Nicaro

**U.S. nickel production**, which last year amounted to only about 5% of the country's nickel consumption, may be in for a boost. Bureau of Mines' Northwest electrodevelopment experiment station (Albany, Ore.) last week described a new leaching process that holds promise of improved recovery of nickel from Nicaro, Cuba, ores.

The present process used at Nicaro starts with roasting of a complex nickeliferous iron ore to reduce nickel and cobalt to metallic form. The metals are then leached with ammoniacal solution, precipitated as carbonates.

Disadvantages of the process: only 75-80% of the nickel (contaminated with cobalt) is recovered; iron-rich tailings contain too much unrecovered nickel, cobalt and chromium to be useful as iron ore.

USBM has concentrated on the recovery of specification-grade nickel (1% cobalt, maximum) from either Nicaro pregnant liquor or from the basic carbonate now in production. It tackled the problem from two sides: separation of cobalt from nickel solution by chemical or electrolytic means; selective leaching of nickel from the carbonate, followed by electrodeposition of the nickel.

Best results to date, says USBM, were produced by leaching the carbonate with a nickel sulfate-boric acid electrolyte. Subsequent electrolytic recovery produced nickel containing an average of 0.4% cobalt, did not exceed the 1% limit until after 549 amp.-hrs. of operation. Power consumption was 1.3 kwh./lb. of nickel at optimum current density of 1 amp./sq. decimeter (9.23 amps./sq. ft.) at both anode and cathode.

Other electrolytes—notably, ammonium fluoride—selectively leached nickel from the ore, but no further purification by electrodeposition was

## Estimated Costs for $TiCl_4$ Made by Cold Chlorination Process

<b>Plant capacity</b>	<b>15,000 tons/year</b>
<b>Capital investment</b>	<b>\$2,200,000</b>
<b>Working capital</b>	<b>\$1,100,000</b>

Processing costs*	\$/year	¢/lb.
Labor	185,500	0.618
Supervision	42,600	.142
Maintenance	154,000	.512
Supplies	23,100	.077
Refrigeration	44,600	.149
Steam	20,300	.068
Water	6,500	.022
Gas	26,300	.088
Power	9,200	.031
Packaging	137,500	.458
Overhead	181,500	.605
Depreciation	220,000	.733
Taxes	44,000	.147
Insurance	33,000	.110
<b>Total*</b>	<b>\$1,128,100</b>	<b>3.760¢</b>

\*Exclusive of costs of following raw materials: ilmenite (18,700 tons/year), 100% sulfuric acid (22,400 tons/year), hydrogen chloride (16,500 tons/year).



## 10,000 hours . . . only \$700 repair costs

*Work record of first Michigan Tractor Shovel important since today's Michigans have same basic power train design*

When the first Michigan Model 75A Tractor Shovel rolled out of Clark's Benton Harbor (Michigan) plant in 1954, company engineers *knew* it was good. But who could expect it to put in 10,000 working hours on a tough job . . . and still be "good enough to last many, many more years," (according to the satisfied owners, Indiana Farm Bureau's Indianapolis fertilizer plant). Five months a year, their "old" 1¼-yard Michigan Tractor Shovel operates on a *three-shift basis*—moving an average of 60,000 pounds of superphosphate and other materials *per hour* from storage piles to mixing units. It also handles mixed fertilizer, cleans spillage, and pushes freight cars.

### Still has original tires, axles

In service equivalent to 5 years' normal 8-hour-a-day use, replacement parts have cost only \$700, according to Lewis Risinger, Master Mechanic. "And," he says, "*we've never broken an axle, or replaced a tire, which is unusual in our operation. I need only three socket*

wrenches to take the whole power-train apart—it's a fast, simple job that sure cuts downtime."

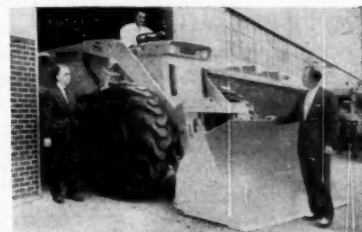
### Operator praises power shift transmission

"I've noticed," says Plant Supt., Melvin Leach, "that whenever there's a choice, operators always pick the Michigan. Even a new man learns to operate it in a hurry." Operator Bob Jefferson especially likes the "power shift and steer, the bucket action, and the fact you don't have to 'grind' gears and wheels to keep close to the pile."

### Liked the first—bought four more

Since he authorized purchase of this first Michigan Tractor Shovel, Ben Scharrer, head of the Bureau's Fertilizer Division, has bought four more Michigans for Bureau plants in Indianapolis and Jefferson, Indiana. "One of the things I've been pleased to see," says Mr. Scharrer, "is that there have been no changes in the basic Michigan design. Except for natural wear, the first

Michigan is as up-to-date as machines coming off the line today!"



### 6000th MICHIGAN NOW ON THE JOB

Michigan Tractor Shovel No. 6,000—produced a little over two years after the first one—is now at work for Ohio Gravel Co., Cincinnati. It has the same all-Clark "flywheel to drive-wheel" power train as do the first and all other Michigan Tractor Shovels.

Michigan is a registered trade-mark of  
**CLARK EQUIPMENT COMPANY**  
 Construction Machinery Division  
 2459 Pipestone Road  
 Benton Harbor 18, Michigan

In Canada: Canadian Clark, Ltd.,  
 St. Thomas, Ontario

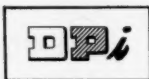
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**EQUIPMENT**





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to get it from  
Eastman . . .**

Sure, when you need an uncommon organic (or an uncommonly pure one) in more-than-test-tube and less-than-tank-car quantities, try Eastman Organic Chemicals Department, Distillation Products Industries, Rochester 3, N. Y.



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## ENGINEERING

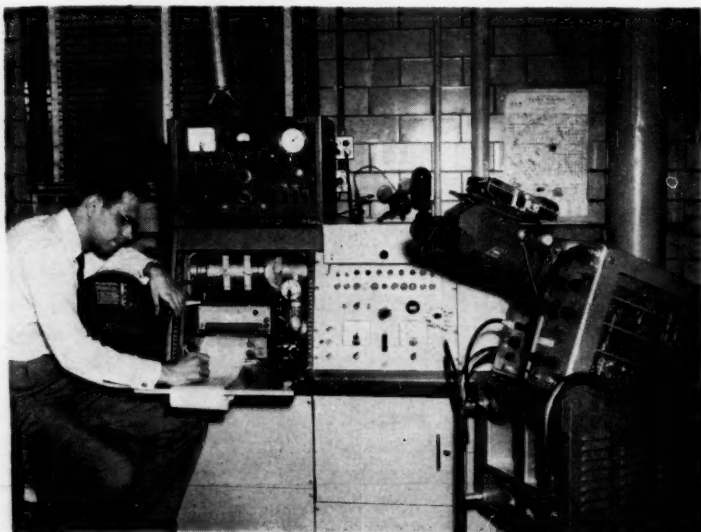
obtained. More work is needed, says USBM, before the process can be scaled up. But it looks like a good bet to help U.S. producers strengthen domestic nickel output.

hydrogen damage in refineries operated by Shell and other companies, is of particular interest to companies that process gases from catalytic cracking plants.

## PROCESSES

**Prevents Blistering:** Shell Development Co. is now offering royalty-free licenses on its patented (U.S. 2,780,583) process for the prevention of hydrogen blistering of steel equipment. Designed to counteract the accumulation in steel of hydrogen resulting from the action of hydrogen sulfide, the method calls for the injection of small amounts of air and ammonia (to maintain proper alkalinity) into processing equipment. The process is said to have substantially eliminated

**Metal Granulating:** A method of directly disintegrating molten ferrosilicon has been developed by Battelle Memorial Institute (Columbus, O.) for Rhude Media Co. (Hibbing, Minn.). Granulation is accomplished by the force of a high-velocity jet of water and gas colliding with a stream of the molten metal, results in rounded particles (50% pass through 65-mesh, up to 70% through 40-mesh). Battelle believes that the process will be useful in eliminating grinding and milling steps in the production of the alloying material.



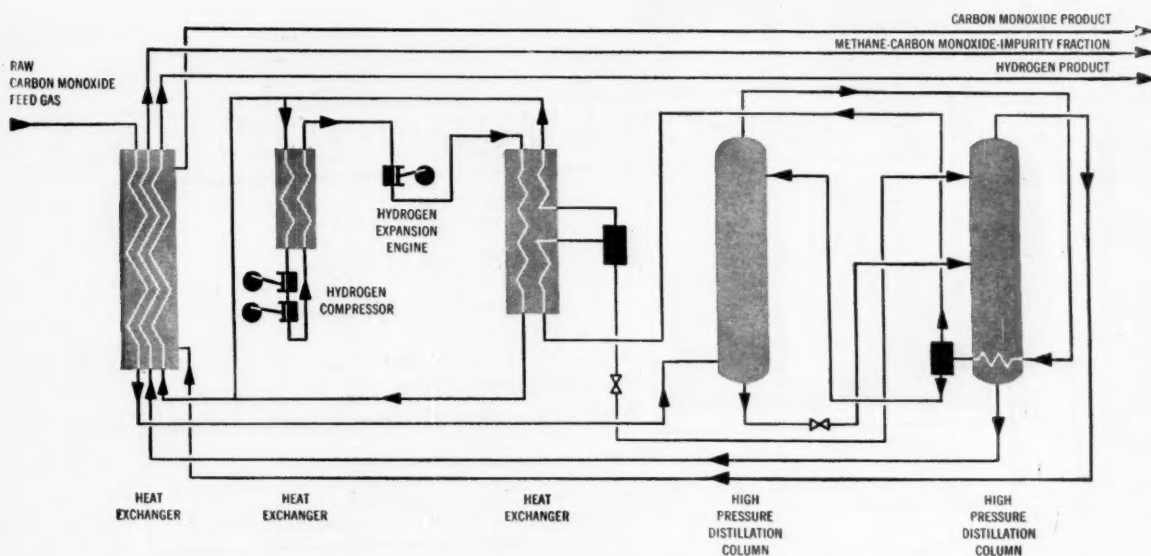
## Instrument Team Tags Compounds

By teaming a new type of mass spectrometer with vapor phase chromatography, Dow Chemical Co. (Midland, Mich.) has come up with what it describes as a very rapid, efficient method of analyzing volatile organics. Key component: a Bendix Time-of-Flight mass spectrometer (Model 12-100) that scans the spectrum from mass 1 to mass 600 at the rate of 2,000 times/second (10,000/second, with slight modification). As in conventional chromatographic analysis, the test material is partitioned in a

packed column, analyzed quantitatively as the components emerge in order of their ascending boiling points. Qualitative analysis is obtained by routing sample components to the spectrometer as they are being separated. Identification is made by visual observation of the spectrum on an oscilloscope screen, or by comparison of a spectrophotograph with the 4,300 standard mass spectra in Dow's files. Mixtures of up to 36 organic compounds have been identified by the new method.



# A new approach to production and purification of carbon monoxide from crude synthesis gas



In the production and final purification of carbon monoxide from crude synthesis gas, low-temperature processing plays an important part. Synthesis gas—produced by steam reforming or various partial oxidations—contains CO, H<sub>2</sub> and some carbon dioxide. From this composition, it is possible to recover up to 95% of the CO, as a product of up to 99.5% purity, using low-temperature equipment designed and built by Air Products, Incorporated.

Air Products carbon monoxide purification plants feature:

- ... high-purity carbon monoxide and hydrogen product streams
- ... maximum recoveries—higher capital return
- ... automatic control—minimum labor requirements
- ... low power consumption
- ... factory assembled plants—with low installation expense

Low-temperature processing is not limited to just this type of gas purification. Designs are available and plants have already been built for such processes as . . . recovery of helium and nitrogen, separately, from natural gas . . . purification of methane . . . recovery of pure hydrogen from cracked petroleum off-gas streams. New processes are constantly being developed, and can be tailored to your needs.

Integrated design, manufacture, erection and operation of Air Products plants makes possible guaranteed results . . . for gas separation, liquefaction and purification systems. Plants are built to customer specifications. Ask us how low-temperature processing can be put to work for you. Your inquiry is invited. Air Products, Incorporated, P.O. Box 538, Allentown, Pa.

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**in Quality Riveting  
As Today...  
in Quality Welding**

Riveted Semi-elliptical Fire Still—1919

-GRAVER-



In 1857 with a small shop and all hand tools, we demonstrated our ability to make **good** tanks. In 1913 with a large plant most fully equipped with modern power tools, we are able to demonstrate our ability to make **better** tanks. The passing years have taught us many things, but best of all they have demonstrated to the trade in general the soundness of our early theories on tank construction.

**STEEL TANKS AND PLATE WORK**

Material in stock for small tanks of 500 to 20,000 gallons capacity

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— 50,000 —  
— 100,000 —  
— 150,000 —

**GALLON TANKS (like cut) IN STOCK  
For PROMPT SHIPMENT & ERECTION  
WRITE for PRICES & SPECIFICATIONS**



Some of the many types of riveted fabrication by Graver,  
as advertised in National Petroleum News, July, 1913

Joining plate with rivets for processing equipment, pressure vessels and storage tanks would be quite unsatisfactory today. Yet, before welding became an accepted fabricating technique, to which Graver contributed measurably in perfecting, Graver's boring and riveting methods were recognized as the most advanced in the country. Today, the most advanced welding, X-ray testing, stress-relieving and assembly methods are employed. This is what you can always expect from Graver—a pioneer in skilled steel and alloy fabrication for 100 years!

Welded Fractionator Tower—1957

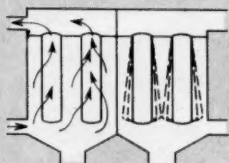
**Building for the Future on a Century of Craftsmanship in Steels and Alloys**  
**GRAVER TANK & MFG. CO., INC.**

EAST CHICAGO, INDIANA • NEW YORK • PHILADELPHIA • EDGE MOOR, DELAWARE  
PITTSBURGH • DETROIT • CHICAGO • TULSA • SAND SPRINGS, OKLAHOMA  
HOUSTON • NEW ORLEANS • LOS ANGELES • SAN FRANCISCO • FONTANA, CALIFORNIA

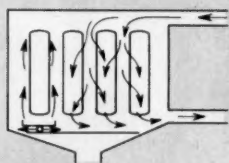
**Chemical Week • July 20, 1957**

82

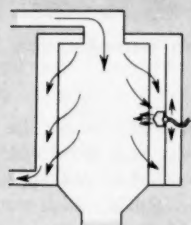
# PRODUCTION



**MECHANICAL-SHAKER TYPE** —  
Unit must be shut down, bags mechanically shaken to knock off dust.



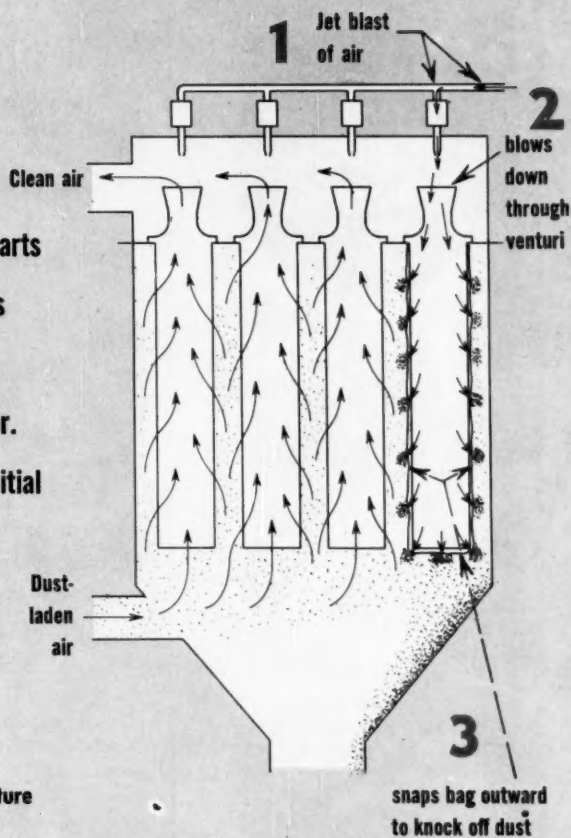
**REVERSE-AIR-FLOW TRAVELER TYPE** —  
Set of bags is blocked off by traveler. Air flows in reverse direction, knocks off dust.



**REVERSE-AIR-JET RING TYPE** —  
Ring of jets around bag travels length of bag. Air blows through bag, knocks off dust.

Internal moving parts of other bag types are eliminated in new dust collector. At slightly high initial cost, it aims to:

- Reduce wear, maintenance
- Improve high-temperature operation



## Now: Dust Collector Without Moving Parts

**This Week**, the three bag-type dust collectors in the left-hand column (*above*) face their first official challenge from the just-unveiled Mikro-Pulsaire Collector—a new unit made by Pulverizing Machinery Division of Metals Disintegrating Co. (Summit, N.J.)—that boasts continuous filter cleaning with no moving parts. The prize: a share of the more than \$17 million spent each year by the CPI for equipment to wrestle with dry dust collection.

**Acceptance Depends:** Just how readily the new unit will be accepted depends on a number of factors.

Initially, it will sell at a premium—about \$1.00/cfm. of air to be filtered (including all auxiliaries except fan) against 50-75¢/cfm. for the other bag types. PM hopes

to reduce the difference as production volume grows, eventually sell units for about 80¢/cfm.

The buyer must balance the additional outlay against the advantages and disadvantages of the Mikro-Pulsaire's type of operation.

In all bag types, as the bags become laden with dust, pressure-drop increases, filter-rate drops. The Mikro-Pulsaire blows 60-80 psi. compressed air (an inert gas is an alternative) down into the bag from a jet nozzle. The jet passes through a venturi at the top of the bag, causes a pressure reduction that sucks in some surrounding air, too. The jet lasts for about 0.1 second, causes the bag to snap outward, flicking off the dust and insuring good bag cleaning. Only 1-2 cfm. of com-

THREE-CARBON FRAGMENTS

KAY-FRIES

MALONIC

ESTERS:  $\text{CH}_2(\text{COOR})_2$

NITRILE:  $\text{CH}_2(\text{CN})_2^*$

ALDEHYDE:  $\text{CH}_2(\text{CH(OR)})_2^*$

CYANOACETIC

ACID:  $\text{CNCH}_2\text{COOH}$

AMIDE:  $\text{CNCH}_2\text{CONH}_2$

ESTERS:  $\text{CNCH}_2\text{COOR}$

TRIETHYL ORTHOPROPIONATE\*

$\text{CH}_3\text{CH}_2\text{C(OC}_2\text{H}_5)_3$

B-ETHOXY ACRYLONITRILE\*

$\text{C}_2\text{H}_5\text{OCH=CHCN}$

\*Development Status

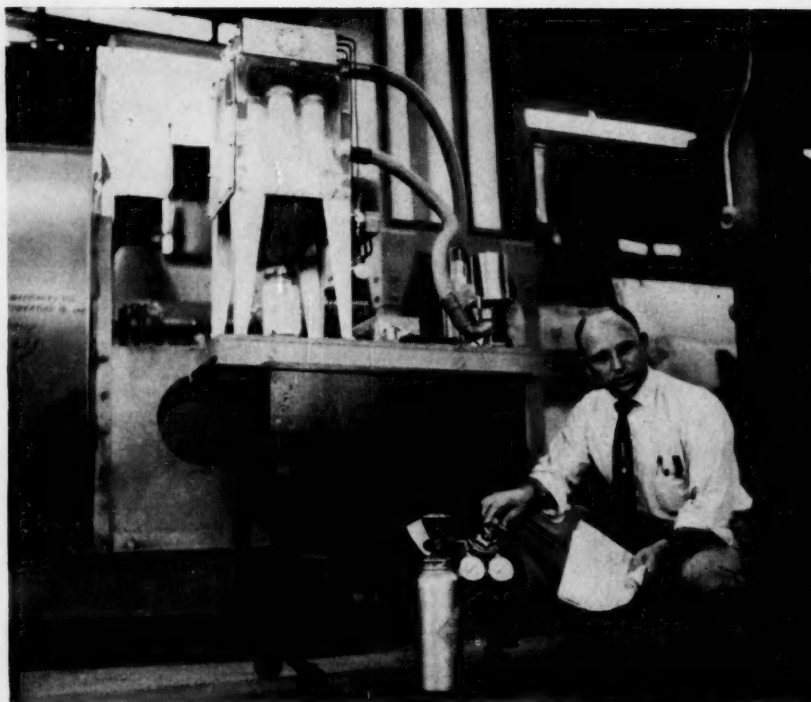
TECHNICAL DATA AVAILABLE



**KAY-FRIES  
CHEMICALS, INC.**

180 Madison Ave., N. Y. 16, N. Y.  
MUrray Hill 6-0661

PRODUCTION



Inventor Reinauer adjusts compressed air on demonstrator unit.

pressed air is used per 1000 cfm. of dust-laden air. Each bag is blasted about once a minute and the jets do not disturb the unit's over-all air flow appreciably. Efficient cleaning allows high dust loadings, means that the dust-laden air may not require scalping in a cyclone or other primary collector.

Each of the three competitive types has moving parts in the bag house (see p. 83). Though the parts are located on the clean-air side, wear and maintenance still occur. On actual plant trial (gypsum) dust for nine months, a Mikro-Pulsaire Collector required no mechanical maintenance other than lubrication of the dust-collection hopper gate. Filter bags that had to be replaced every 10 days when the jet-ring type of collector was used required only one replacement in nine months with the new collector.

**Higher Temperatures:** Less bag wear means that special bag materials may be used more readily, permitting high-temperature applications. Conventional bag temperatures are about 180 F for cotton, 250 F for Dacron and felt, 275 F for Orlon. Glass permits temperatures above 600 F, but fibers break readily under mechan-

ical action. But when the Mikro-Pulsaire's jet time is increased to 0.6 second, wear does not appear to be excessive. Other high-temperature fabrics are being tested.

**Rapid Development:** The idea for the collector was thought out one night in March last year by PM's chief engineer, Tom Reinauer. Always intrigued by the venturi, he proved its use was feasible within two weeks. A demonstrator unit (*photo, above*) was built, shown to the American-Marietta\* board of directors. The first plant unit was put on test in October, several others have been built since and sold or are being tested. (A-M plans to try one on cement; others will be tried on carbon black, metals, food.)

Largest unit now made has only 5000-cfm. capacity, requires 48 bags, each 6-ft. long and about 4-in. diameter. As the number of bags is increased, the arrangement of auxiliaries becomes more complex. One simplification has been to arrange for six jets to fire simultaneously. But with large capacity units, the auxiliaries could become a real problem.

No problem thus far, however, has proved insolvable.

\*PM's parent, Metals Disintegrating, is a subsidiary of American-Marietta.



## THE GOOD EARTH IS TOUGH ON TIRES

Plowing, planting and cultivating America's ever-increasing harvests are grueling tasks for tractor tires. The punishing abrasions exerted by stones and earth, the tremendous thrust of traction, the long exposure to the hot sun . . . these call for tires of extreme toughness. Similarly, high speeds and long-distance driving call for extra durability in truck and car tires.

That's where Olefins, one of the Atlantic petrochemical family, come in. (Hence the miniature refinery in the picture.)

Atlantic Olefins help build stronger, long-lasting tires. Olefins are hydrocarbons used in making anti-oxidants, which inhibit the dangerous drying-out effects that attack sidewalls due to oxidation. In addition, Olefins stabilize the rubber against degradation due to heat and light. Result: the consumer gets a tire that is more blowout-proof and abrasive-resistant.

Your own business may have use for Olefins or any one of a wide variety of Atlantic petrochemicals. Atlantic sales engineers will work closely with your engineers to help improve quality, cut costs, or develop new products. For details, write, wire or phone The Atlantic Refining Company, Dept. H-7, 260 South Broad Street, Philadelphia 1, Pa.



Philadelphia, Providence, Charlotte, Chicago • *In the West:* L. H. Butcher Co.  
*In Canada:* Naugatuck Chemicals Division of Dominion Rubber Co., Ltd. • *In Europe:* Atlantic Chemicals SAB,  
Antwerp, Belgium • *In South America:* Atlantic Refining Company of Brazil, Rio de Janeiro

**ATLANTIC**  
**PETROLEUM**  
**CHEMICALS**

## PRODUCTION

## EQUIPMENT

**Compressor:** Gardner-Denver Co. (Quincy, Ill.) offers its new ADL-1000 compressor to those who may require extra air capacity at times, but don't wish to purchase a second compressor. The 20 hp., two-cylinder vertical compressor is a two-stage, air-cooled unit. For continuous service, it has a 100-cfm. piston displacement at 870 rpm. and a discharge pressure of 150 psi. For intermittent service, discharge pressure is as high as 250 psi.

**Liquid-Level Transmitter:** A new differential-pressure liquid-level transmitter for measuring slurries and viscous liquids in open or closed vessels is made by The Foxboro Co. (Foxboro, Mass.). Called Type FA d/p Cell Transmitter, the unit operates on the force balance principle, is said to maintain accuracy over a wide range of ambient conditions. Purging systems, auxiliary signal amplifier are not required. Wetted parts are 316 stainless steel. Pneumatic output: 3-15 psi., signal proportional to tank level.

**High-Efficiency Lamp:** General Electric Co.'s Lamp Division (Cleveland) recently brought out a 1500-watt mercury quartz lamp that operates at an efficiency of 54 lumens/watt. The lamp is recommended for large outdoor and indoor areas where better-than-average illumination levels are needed, operates without a glass jacket. Designed specifically for New York International Airport's new parking lots, the lamps will use  $\frac{1}{3}$  the number of housings,  $\frac{1}{2}$  the number of light-poles as conventional lamps, GE estimates. Over-all length of lamp:  $19\frac{1}{16}$  in.

**Plastic Cover:** Herculite F36 Clear is a new fabric offered by Herculite Protective Fabrics (Belleville, N.J.) for keeping working areas free of dust and fumes, while allowing penetration of natural light. Made of a double lamination of vinyl over a mesh of Fortisan 36, the fabric is waterproof, fire-resistant, rot- and mildewproof, light in weight.

**Centrifugal Pumps:** The New York Air Brake Co.'s Aurora Pump Division (Aurora, Ill.) is out with a new series of end-suction, general-purpose centrifugal pumps designed to meet critical suction conditions. Sizes:  $\frac{1}{8}$  to  $7\frac{1}{2}$  hp. at 3,500-1,750 (60-cycle) speeds and 2,880-1,440 (50-cycle) speeds, ac. or dc., all voltages and phases.

**Process Control:** The RW-300, a new fully transistorized digital computer for automatic process control, is being offered by The Ramo-Wooldridge Corp. (Los Angeles). The computer will read process instruments, relate the readings to process objectives, determine the control action required for optimum plant operation,

activate the process mechanisms or adjust set points on supervised control loops. The unit can also be used for general-purpose computation, monitoring function of a data logger. RW-300 measures 55 x 28 x 36 in., weighs 400 lbs.

**Temperature Chamber:** The new Tenney Series Ten temperature test chamber, manufactured by Tenney Engineering, Inc. (Union, N. J.), has 10 cu. ft. of work space, requires no installation service other than single plug-in electrical connections. The chamber uses single-stage and cascade refrigeration systems, comes in four standard assemblies with low temperature limits of -40 F, -85 F, -100 F, and -120 F; high temperature limits: 240 and 350 F. Relative humidity: 20 to 100% (limiting conditions: 35 F dewpoint, 5% at 160 F).

**Gasketing Materials:** Five new high-density fiber gasketing materials make it possible to obtain Armstrong Cork Co.'s Accopac seals for lower flange pressures. AS-460 asbestos with GRS synthetic rubber binder seals at 2,000 psi., performs at 500 F. AD-870 asbestos with neoprene rubber binder seals at 2,000 psi., performs at 500 F. AN-890 asbestos with nitrile rubber binder seals between 1,500-2,000 psi., performs at 500 F. CN-808, a combination of cellulose fiber, cork and nitrile rubber, seals at 800 psi. N-840, for heavy-duty service where compressibility is at a minimum and bolt torque retained, seals at 1,500 psi.

**Temperature Indicator:** For rapid temperature measurements at closely differentiated points in a fluid, Royco Instruments (Albany, Calif.) offers its new Model CTL. The meter housing fits in the hand, has a 12-in. stainless-steel probe with 30 in. of flexible, armored cable attached. Response: two seconds; accuracy: better than 5%. Temperature ranges: 0-300, 0-450, 0-650 and 0-1000 F.

**Bull Plug:** Crawford Fitting Co. (Cleveland) is out with the Danger Signal Bull Plug for providing a safe method of access to a threaded port in piping or a valve. When the plug is removed from the port, attached chain and ring slipped over the pipe keeps plug hanging near the opening to warn of the unsafe operating condition. Red band on the plug makes it easily seen.

**Explosionproof Hygrometer:** The Process Instruments Division of Beckman Instruments, Inc. (Fullerton, Calif.) has recently unveiled a new explosionproof electrolytic hygrometer for continuous measurement of moisture concentration in gas streams. The hygrometer has a contact meter and relay for attaching an alarm system that can be set for any point in the instrument's range—0-1,000 ppm. at temperatures up to 100 C. Accuracy: 5%. Model 18401 comes in copper and brass, Model 18402 in stainless steel.



## DIVERSITY

a wide variety of  
skills...stimulated by  
creative thinking,  
tempered by solid  
experience...combine to  
produce superior results  
at lowest engineering  
and construction costs  
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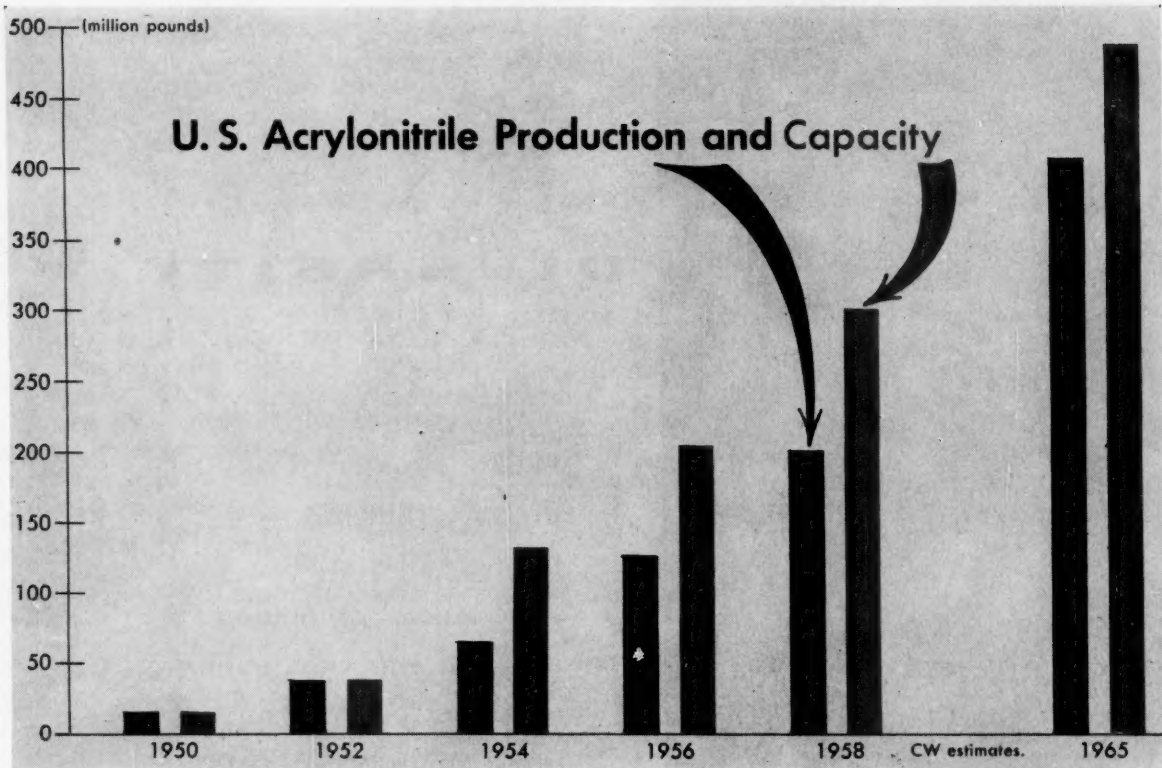
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# MARKETS



## Acrylo Capacity: Enough for How Long?

When all acrylonitrile expansions now underway are completed sometime late in '58, total U.S. capacity will have stretched a full 100 million lbs./year over producers' present productive capability of some 200 million lbs. A big biannual jump has become a characteristic of acrylo capacity—it's happened before (see chart), and chances are that next year's boost won't be the last in the foreseeable future.

Although there's another definite gap in sight between capacity and actual production of acrylonitrile, the spread isn't accidental. The industry appears to build with confidence that its two-year forecasts of demands will be fulfilled. And an almost certain soaring of demand (for acrylic fibers, nitrile rubbers, and other uses) in the near future is already raising the pertinent poser: How long will the increased '58 capacity remain broad enough to blanket fast-spreading requirements?

Less than two years ago, however (*CW*, Oct. 1, '55, p. 69), producers did evince considerable concern when American Cyanamid's Fortier, La., and Goodrich's Calvert City, Ky., installations boosted U.S. capacity a towering 100 million lbs. above the then less-than-100-million-lbs./year consumption rate.

Indicative of acrylonitrile makers' optimism about the prospective growth in demand are these spelled-out expansion plans by three of the four major producers:

- Monsanto will hike its present estimated 60-million-lbs./year Texas City capacity to more than 100 million lbs.; the new installation should be ready at year's end.
- Carbide is doubling (to an estimated 70 million lbs./year) acrylo-producing potential at its Institute, W. Va., plant, hopes to have the expansion completed by mid-'58.
- American Cyanamid next year will also double its current acryloni-

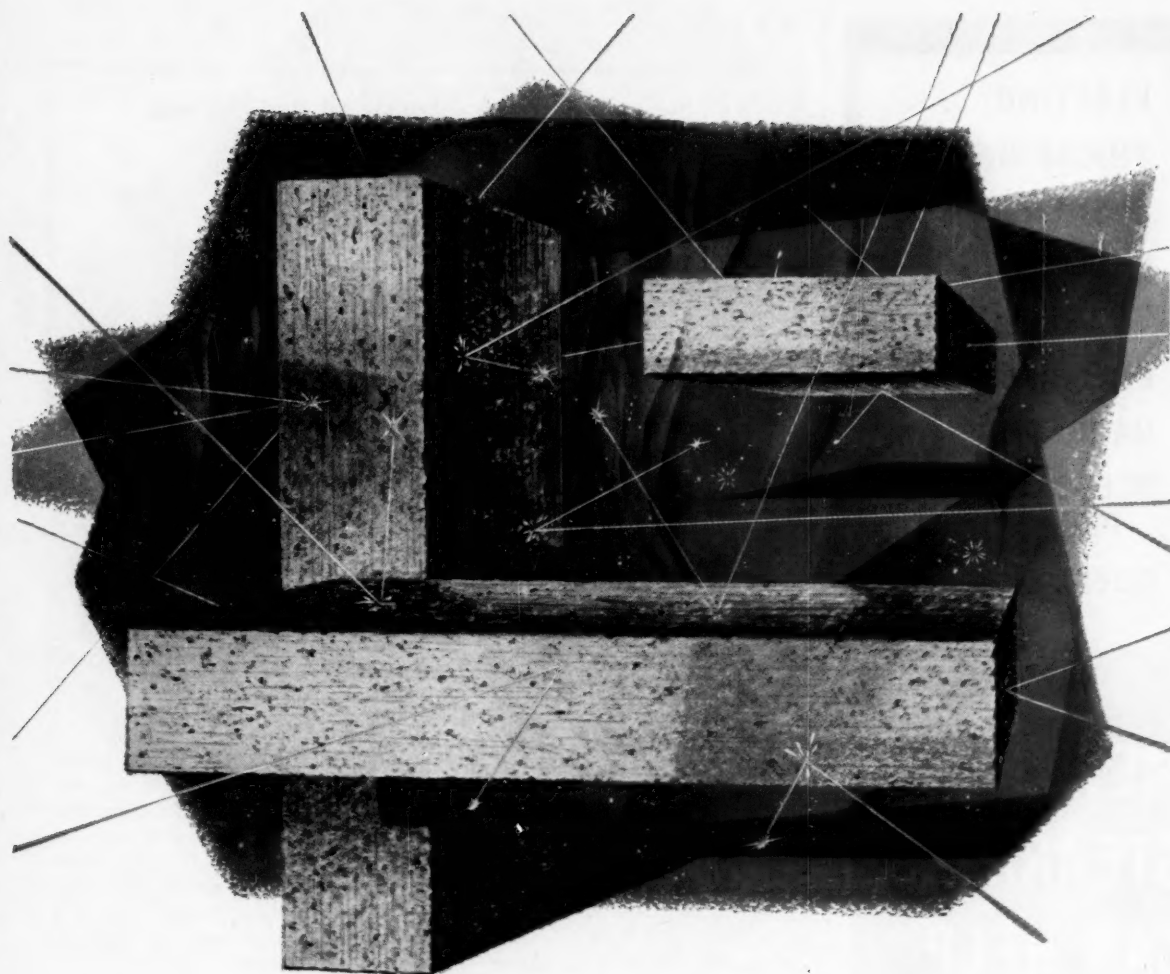
trile capacity of 50 million lbs./year at Fortier, La.

B. F. Goodrich, fourth and last to get into production of acrylonitrile, hasn't expanded its original 24-million lbs./year monomer unit (part of the acetylene complex at Calvert City, Ky.), but is broadening horizontally; a \$2.5-million plant to manufacture specialty acrylic polymers is scheduled for completion in October of this year.

American Cyanamid, incidentally, is responsible for the one significant alteration, in the last year or so, in the lineup of acrylo-producing plants. The company cut out production at its old 35-million-lbs./year Warners, N.J., plant, announced late last year that the unit could be considered as "relatively obsolete," with nominally stand-by capacity.

Early last month, in a move that justifies the stand-by label, operations on a limited scale were restarted at the Warners plant; production there will supplement reduced output of





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## MARKETS

### Estimated Acrylonitrile End-Use Pattern

(million pounds)

Use	1958	1960
Acrylic fibers	125	190
Nitrile rubbers	28	48*
Plastics	10	20
Other	15	20
Total	178	278

\*Includes about 8 million for export to Canada.

the Fortier plant until the slated capacity-doubling at the latter location is tied in to existing facilities.

**New Faces?** The upcoming acrylo expansions will hike the industry's potential to almost 300 million lbs./year—but that accounts only for the plans that have been revealed by current producers. For years the trade has been intrigued by—and at times seriously concerned over—the possibility that new producers were on the verge of plunging into acrylo manufacture. Such trade talk has involved several major oil companies (Shell, Phillips, Sinclair), just about all acetylene producers, many chemical companies—including Rohm & Haas, Du Pont and others.

The Du Pont speculation pops up perhaps most frequently since, via its Orlon operations, it's the largest acrylonitrile consumer in the country. But company spokesmen tell *CW* that "Du Pont has no plans at this time to enter acrylo production, is contracted well ahead for all its foreseeable requirements."

Market observers have also tapped as "possible" producers: W. R.

Grace, Allied, Eastman, Dow, Olin Mathieson and—currently the hottest prospect—Escambia Chemicals. The latter is admittedly working on, and pilot-planting, a new acrylonitrile process that may substantially reduce production costs. The method is said to involve use of dilute acetylene pulled directly out of a Wulff or Sachsse burner.

Escambia officials aren't certain themselves whether the company will get into acrylonitrile production. But if their researching pays off, the firm will have one of the two concededly valid reasons for getting into such operations: a new process "that is a more economical route to acrylonitrile manufacture."

The second potent lure for potential acrylo makers is to have a strong captive position. Dow and Eastman would now fit logically into this category; both will begin commercial production of their acrylic fibers next year. Dow's Zefran plant (Lee Hall, Va.) will have a capacity of 14 million lbs./year, and Eastman will put up a similar-size plant to make Verel at Kingsport, Tenn.

The latter company has done a

### U. S. Acrylonitrile Capacity 1958 (Est.)

(million pounds)

American Cyanamid	Warners, N.J.	35*
	Fortier, La.	100
Union Carbide	Institute, W. Va.	70
B. F. Goodrich	Calvert City, Ky.	24
Monsanto	Texas City, Tex.	100

\*Deductible from total when Fortier expansion is completed.



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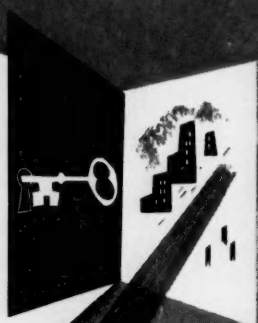


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## MARKETS

lot of research on acrylonitrile processes, but the signs point even more decidedly toward Dow's entry into such production. Ethylene oxide is a prime requisite for acrylonitrile manufacture and Dow will increase its current 240-million-lbs./year oxide capacity to some 300 million when a new plant at Plaquemine, La., comes in, early in '58 (*CW*, June 15, p. 77).

Consider, too, the company's line of acrylonitrile-styrene copolymers and its acrylamide interest, and the conclusion seems logical that Dow will one day switch from a purchased to captive acrylonitrile position.

When queried directly by *CW*, however, Dow would not comment one way or the other. The reason is understandable. Entry of more companies into the acrylo arena may well foreshadow a lively scramble for markets. Why? It appears that the present roster of producers should be able to handle the country's requirements at least through '59 and probably well into '60.

**Fiber Support:** Main prop for acrylonitrile, of course, is manufacture of acrylic fibers—and prospective use in the synthetics will continue to hulk over all other outlets (*see end-use pattern*). The acrylics have come a long, rough way since their "miracle fiber" days, have weathered such bumps as overzealous promotion, serious production problems (brittleness, dyeing difficulties). As recently as five years ago, few believed that acrylic fibers, as a group, would by now be stretching toward a '58 capacity of some 216 million lbs. (*CW*, April 20, p. 126.)

But further expansions among established acrylics (Du Pont's Orlon, Chemstrand's Acrilan, Carbide's dynel), start of full-scale production of the newer fibers (American Cyanamid's Creslan, Dow's Zefran, and Tennessee Eastman's Verel), plus probable commercial introduction of additional acrylic fibers, could push total acrylic fiber capacity close to or over 300 million lbs. within the next half-decade.

**Nitrile Next:** Nitrile rubber (N-types of synthetic) has had a far more normal growth pattern than has the acrylic fiber group. Its consumption of acrylonitrile has inched up rather than grown in multi-million-lb. leaps. It's interesting to note, however, that



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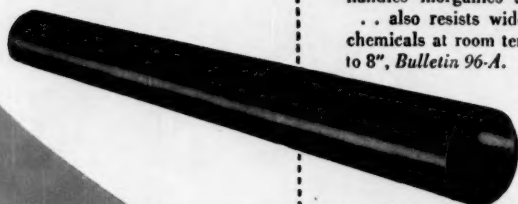
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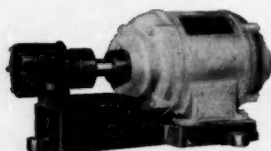
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## MARKETS

as recently as 1950—when the synthetic fibers were barely making a dent, percentage-wise, in the acrylo market—nitrile rubber was consuming as much as 70-75% of the then-available 15 million lbs. of annual acrylonitrile production. During '58, synthetic rubber will slice out about 16%—or some 28 million lbs.—of the acrylonitrile-use pie.

U.S. output of N-type rubber (including latex) may hit 38-39,000 long tons next year, a fair increase over this year's estimated 35-36,000 tons, and a considerable step-up over the 21,400 tons produced in '54, the year the government's synthetic rubber facilities were transferred to private owners.

Nitrile rubber outlets have undergone some radical changes since World War II, when its biggest use was in self-sealing linings for gasoline tanks in military aircraft and in rubber pipelines used to transfer fuel from tankers to naval vessels.

Today there are three major end-use areas: mechanical rubber goods, such as seals and gaskets, gasoline hose, valve parts; paper treatment (providing toughness and resistance to oil, solvents, water, and tearing); and transportation (auto and aircraft applications where oil and weather resistance is needed).

Goodrich, whose acrylonitrile production is completely captive, tells *CW* that the "biggest area of future growth for its N-type rubber (Hycar), is in the textile field"—as a binder for nonwoven fabrics and in treating wash-and-wear fabrics.

The company's soon-due acrylic polymer plant at Calvert City will manufacture specialty products for a raft of uses including textile sizes, foundry core sand, flocculating agents, and latex paint formulations.

**Plastics Nudge:** Use of acrylonitrile in plastics hasn't moved along as spectacularly over the last five or six years as some marketers had hoped, but growth has been steady. In 1952, estimated consumption amounted to about 5 million lbs.; next year this outlet should take about 10 million, and that's expected to double by '60.

Use of acrylo in plastics will really step up, though, if expanding producing facilities are any criteria. Acrylonitrile-styrene-butadiene terpolymer-products are a case in point. Nauga-



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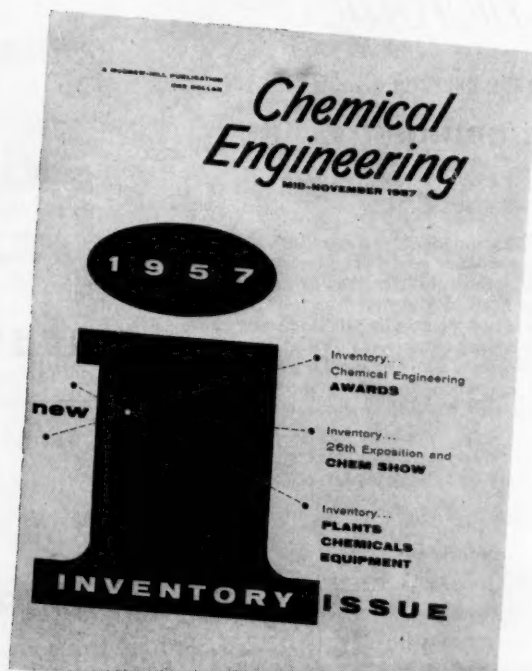
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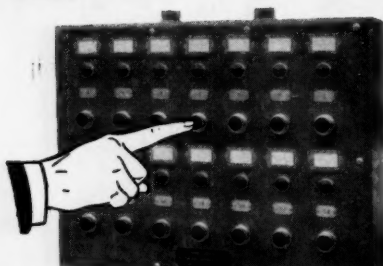


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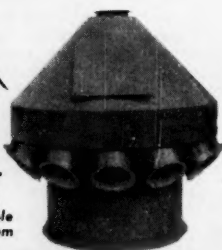
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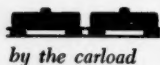
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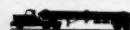
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## MARKETS

tuck (U. S. Rubber's chemical division) is putting up a second Kralastic resin plant at Baton Rouge, La., due to be in operation in December of this year. Cost: \$7 million. (The company is also spending \$2 million to expand its present Baton Rouge facilities for turning out Kralastic resin and an oil-resistant synthetic rubber.) No breakdown figures are available, but when the expansions are completed, Naugatuck will be able to produce a total of 60 million lbs. of resin and rubber.

Marbon Chemical (Borg-Warner) early last month turned valves on its new Cyclocac resin plant at Washington, W. Va. Speculation is rife in the trade (1) that Marbon is producing at an initial rate of 10-15 million lbs./year, and (2) that capacity at the Washington location will be increased to about 50 million lbs. in '58, and (3) that the company will start building a second 50-million lbs./year plant in '58.

Fact is that Marbon's new West Virginia plant is designed (and all piping already installed) to turn out upwards of 100 million lbs./year of the acrylonitrile resin. New lines will be gradually added as demand warrants, but it appears unlikely that full capacity will be in place before 1965.

And Marbon plans to continue operating its older Gary, Ind., plant.

The thermoplastic terpolymers have high impact and high distortion strength, qualities that should broaden their use in fabrication of pipes (now the biggest use), radio cabinets\*, etc.

Acrylonitrile-styrene copolymers (e.g., Carbide's Bakelite C-11, American Cyanamid's Cymac, and Dow's Styrex 767) haven't been coming along as dramatically, but hopes of producers are still high.

**Where But Up?:** Thus, with most acrylonitrile-consuming outlets definitely on the trend up, few will dispute the contention that all the capacity increases now in sight will—over the long term—be strained to satisfy the country's needs. It's one solid reason why current producers aren't too worried about the upcoming surplus-capacity. Brows will be furrowed, though, if the present list of acrylonitrile makers lengthens too soon. And that is more than possible.

\*Cyclocac was the material used in fabricating those radio cabinets shown (in television commercials) being dropped out of helicopters and hurled down stairs. Since then the manufacturer has switched to a less expensive high-impact styrene.



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# Market Newsletter

CHEMICAL WEEK

July 20, 1957

**There's more official verification that nickel supplies,** in short supply for some time, are heading for a more ample position. The government, through General Services Administration chief Franklin Floete, has rejected a proposal by International Nickel that the U.S. agree to buy a part of the company's expanded output (*CW*, May 19, '56, p. 154) for stockpiling.

Reasons for the turndown are many, include the fact that nickel expansion already under way (including Inco's) will boost total amount available to the U.S. to 440 million lbs./year by '61, some 140 million lbs. above the present level.

Inco, which supplies more than half the U.S. requirements, is currently shelling out about \$115 million to develop new deposits in Manitoba. It had hoped to obtain a U.S. commitment to take up to 150 million lbs. of nickel (during a 2½-year period starting in mid-'60) as a "spur" to push the completion of the project. Price-tag on the nickel would have been the current market price (approximately 74¢) or the prevailing U.S. price, if lower, at the time of the purchase.

Rejection of the proposal further emphasizes the apparent belief of Washington defense planners that nickel shortages will be over within the next couple of years or so: the action follows the Office of Defense Mobilization's recent ending of fast tax amortization for new U.S. nickel facilities on the grounds that the ODM goal of 440 million lbs./year is well on its way to being filled.

•  
**Zinc prices are still being buffeted.** Another producer has chipped his posted price down to 10¢/lb., following the July 1 cut to that level by two leading smelters. The new tag, though a full 3½¢/lb. lower than prices in effect just a few months ago, isn't doing much in the way of prodding zinc buyers. The market is being described by observers as "dormant."

•  
**Oxygen and acetylene in cylinders will cost more next month.** Linde Division of Union Carbide initiated the move toward higher prices with announcement late last week that it would hike its oxygen (for industrial cutting and welding) by 7¢/100 cu. ft., and acetylene by 25¢/100 cu. ft.

The increases, which become effective Aug. 1, do not apply to gas sold on a tonnage basis to bulk users. Behind the increase is the now-familiar plaint—higher manufacturing and distributing costs.

•  
**The ethyl alcohol market in the U.S. is rather tight** at the moment, and the same condition apparently prevails in Europe. There's

## Market Newsletter

(Continued)

trade talk that domestic producers are turning down export orders because of short supply.

At least one U.S. maker, however, though not yet firmly committed, expects to ship 2-3 million gal. to Germany sometime later this year, probably in the fourth quarter. The firm tells *CW* it should have that much available for foreign placement above and beyond amounts needed here for domestic accounts. Prices on the overseas shipments will scale at—or above—domestic schedules.

**Whats' the outlook for polyether-based urethane foam?** It could "make all other cushioning materials obsolete," says General Tire & Rubber's president, W. O'Neil. The company, which earlier discontinued production of conventional polyester-based urethane, has now gone into volume production of its polyether product (Polyfoam) at its Marion, Ind., plant.

General, of course, isn't the only company interested in the polyether urethane (others are evaluating the material), but it has stepped out ahead of the field.

Meanwhile—and underscoring the anticipated sharp shuffling for resilient foam outlets (*CW*, March 10, '56, p. 62)—activity has heightened in the vinyl foam arena. Union Carbide, which recently obtained patents and experimental equipment of Elastomer Chemical, will offer additional licenses and make available to licensees "technical developments in the production of the foam to increase its commercial acceptance."

Currently, foamed rubber latex has the major portion of the estimated 240 million lbs./year foam market, but urethanes and vinyls are slated to make some significant inroads within the next couple years.

**Boron trichloride moves up to the big time**—and the price comes down. Stauffer, currently the only company shipping the vital high-energy-fuels raw material in ton and tank-car quantities, is trimming schedules because of economies resulting from expanded facilities at Niagara Falls. The trichloride in 100-lb. cylinders, for example, drops to \$1.70 from a previous \$3/lb. selling price. But the price may still be high for "commercial" high-energy-fuel applications (see also p. 35).

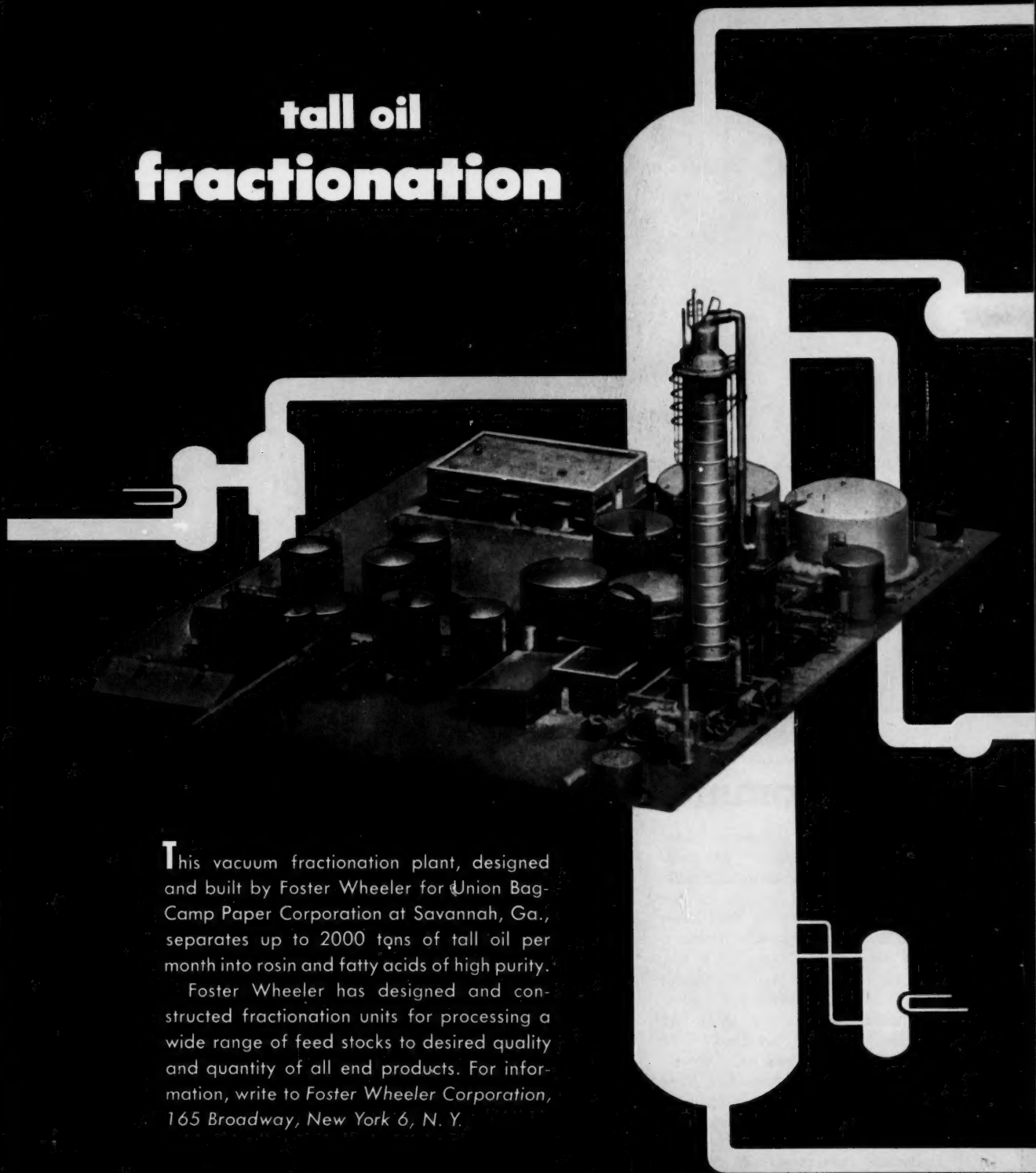
### SELECTED CHEMICAL PRICE CHANGES — WEEK ENDING JULY 15, 1957

	Change	New Price
<b>DOWN</b>		
Boron trichloride, 100-lb. cylinders	\$ 1.30	\$ 1.70
Copper hydrate, dms., c.l., frt. alld., E. of Miss.	0.0225	0.4925
Molasses, blackstrap, feed-grade, tanks, New Orleans, per gal.	0.005	0.19
Selenium, powd., 99½%, dms., divd.	1.50	10.50
Tungsten, metal, powd., 2-5 microns, dms., wks.	0.50	4.10

All prices per pound unless quantity is stated.



# tall oil fractionation

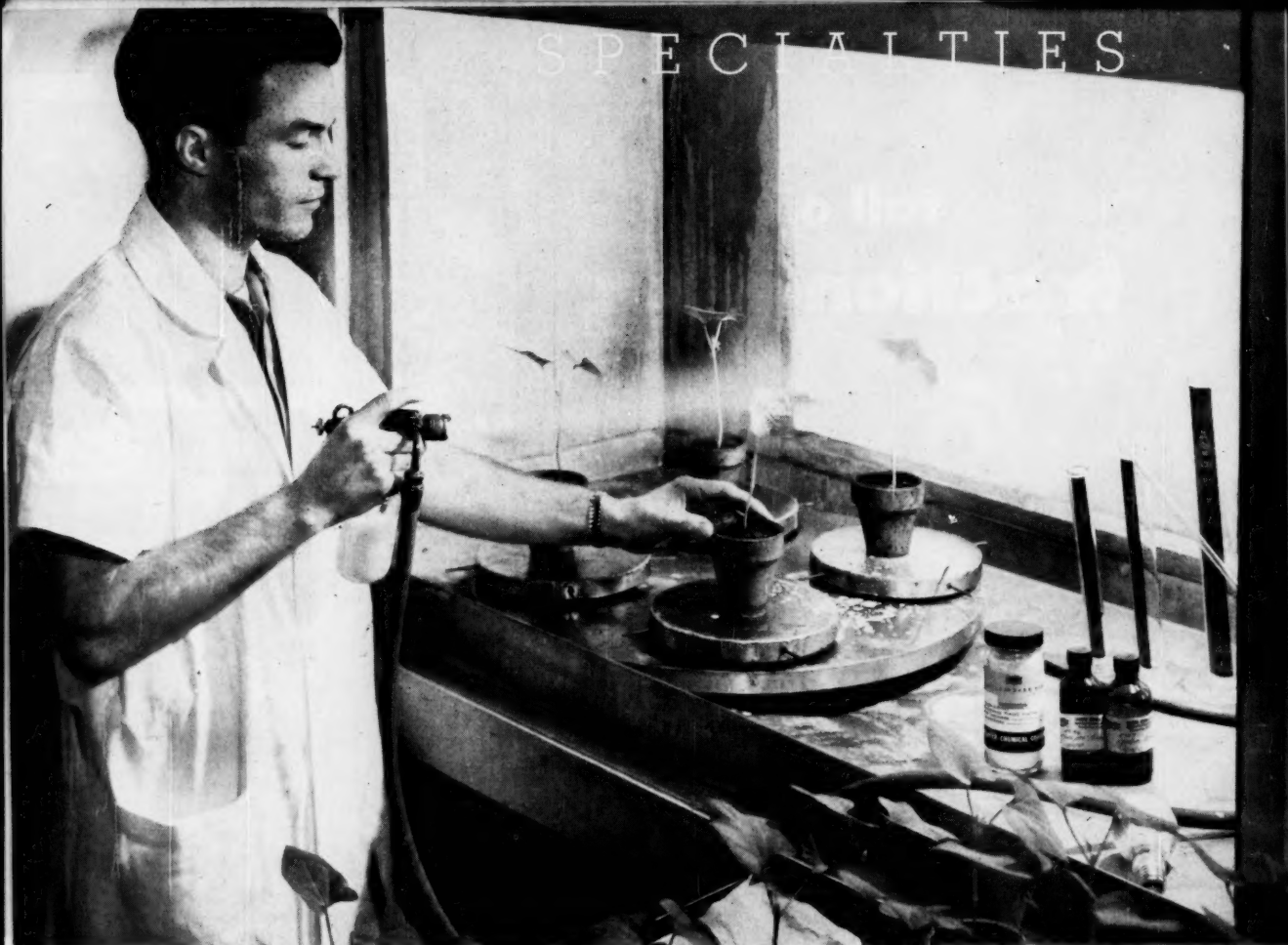


**T**his vacuum fractionation plant, designed and built by Foster Wheeler for Union Bag-Camp Paper Corporation at Savannah, Ga., separates up to 2000 tons of tall oil per month into rosin and fatty acids of high purity.

Foster Wheeler has designed and constructed fractionation units for processing a wide range of feed stocks to desired quality and quantity of all end products. For information, write to *Foster Wheeler Corporation, 165 Broadway, New York 6, N. Y.*

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Long series of trials in laboratories and on test farms preceded introduction of . . .

## New Commercial Miticide—Third this Year

Protected by a just-granted new-compound and use patent\*, and backed up by two years' of tests, Stauffer Chemical is now launching its new Trithion miticide. It's the third major miticide to be introduced commercially this year (CW, April 20, p. 60).

Trithion is a phosphate (0,0-diethyl S-p-chlorophenyl-thiomethyl phosphorodithioate), like the other two miticides—Chipman Chemical's 6199 and Hercules Powder's AC 528—introduced this year. And, like these two predecessors, the new compound has a broader range of insecticidal activity and a longer period of effectiveness than most miticides previously offered. Besides killing mites in both the egg and adult phases, Trithion destroys aphids, scale insects and other farm pests such as leafhoppers, thrips and caterpillars.

Stauffer says Trithion presents rel-

atively little hazard to plants and animals. Residue limits for Trithion on food crops are expected soon; already, it can be used on cotton, seed crops, beans and almonds.

Major selling effort will focus on a concentrated emulsion or "flowable" form, containing four pounds of the miticide per gallon. But dusts containing 1%, 3% and 5% active ingredient are offered, as well as a 25% wettable powder.

**Antimite Pair:** Stauffer has another miticide, Sulphenone, on the market. But sales of this chlorinated compound have been largely limited to apple growers of the Pacific Northwest. The company says it will continue to offer Sulphenone, even after Trithion is approved for use on food crops.

Stauffer isn't talking prices, other than to say the new pesticide is competitive in use-cost to systemic miti-

cides. Production is in the semiworkstage; a new plant is being designed.

**Individual Venture:** Stauffer has long been a major producer of such standard insecticides as DDT and benzene hexachloride. An affiliate, Calhio Chemical, produces the fungicide captan, which both Stauffer and California Spray Chemical market.

In its recently developed Vapam soil sterilant, experimental herbicide EPTC†, and Trithion, however, Stauffer hopes to have a line of agricultural chemicals that it—and it alone—makes. A major sales effort for these products is planned.

Stauffer figures it can sell Trithion alone at a 10-million-lbs./year rate within a few years. But the competition in miticide-selling will be rougher than ever now, with three new products scrambling for the farmer's dollar.

† EPTC is ethyl N-N di-n-propylthiocarbamate; Vapam (now licensed to Du Pont, who sells it as VPM) is sodium methyl dithiocarbamate.

\*U.S. Patent 2,795,224



## ...and one for the pot!

Witches of old brewed heroic broths to encourage visions, prognostications, spells, and spasms. Even unrequited love yielded to these near-lethal potions. Add the tail of a cat, the ear of a rabbit, sixteen varieties of tree roots, and a few "trigger" ingredients, known only to the witches guild... and stand back!

Folklore ignores the witches' maintenance problems, but such overwhelming corrosives must have liquidated many a cauldron inventory. After all, the witches had no titanium.

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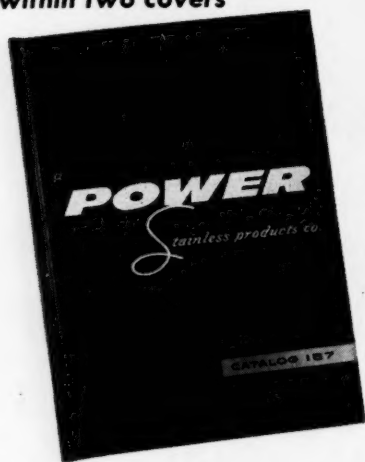
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July 20, 1957 • Chemical Week

103

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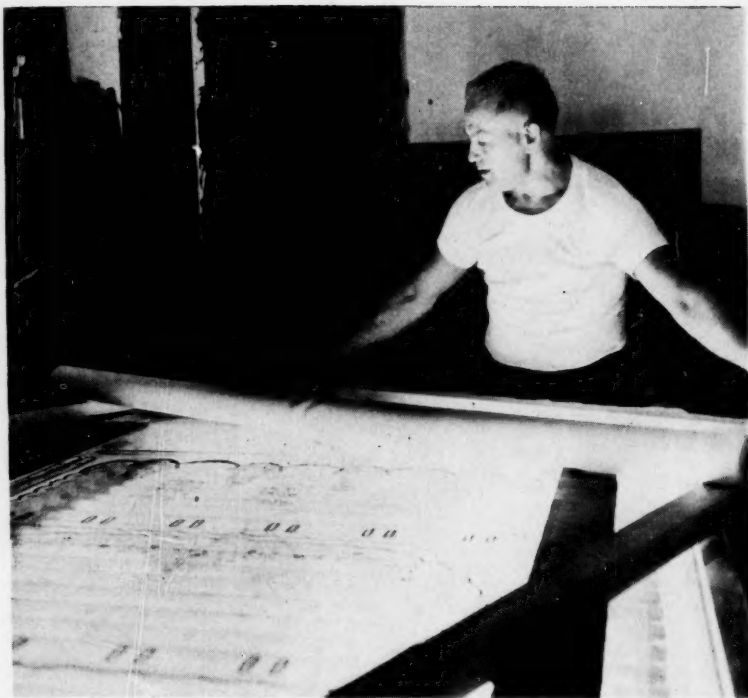
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## SPECIALTIES



Schulsinger: "There isn't any problem I can't solve."

## Silk-Screeners' Idea Man

From his three-room combination office-lab-factory in the bustling Union Square district of New York, Sidney Schulsinger turns out coatings for the graphic arts. Newest product to come from the enterprising one-man firm is an acrylic coating called Brite-Cote.

Primary use of the material is a vehicle for bronze powder in bottle labeling and printing. It promotes adhesion, prevents tarnishing of the printing. Its inventor is now working to incorporate transparent dyes into this coating, to allow four-color process reproduction of photographs in silk-screening.

Schulsinger started his business in 1948, capitalizing on a life-time interest in the fine arts, and technical training in radiology acquired in the service during World War II.

His first product (and mainstay of the business) was a modified vinyl plastic which does away with troublesome gelatin emulsions and carbon tissue films in the making of silk screens by photographic methods. Called Nu-Sol, the material was developed about 10 years ago by way of trial-and-error tests with all the water-

soluble resins Schulsinger could find.

Schulsinger first used the vinyl in his own work, which at that time was silk screen printing, later let a few close friends try it. Favorable comment spread and Schulsinger found himself in the specialties business.

This product now sells for \$20/gal., is marketed by two distributors, one for the ceramics industry, and one for silk-screen makers.

**Look Around:** Once assured of a market for the product in screen-making, Schulsinger began to seek new uses for his coatings. One hope: in the making of photo-engravings.

Here, the coating, rendered light-sensitive, is applied to metal in place of the familiar gelatin-albumin coating. The plastic eliminates the need for acid resists and some washing steps in the engraving process. Plastic remaining on the metal after engraving is completed doesn't have to be washed off; it is hard enough to be used as a printing surface. All the problems of this application aren't solved yet, but Schulsinger is confident of having them whipped soon.

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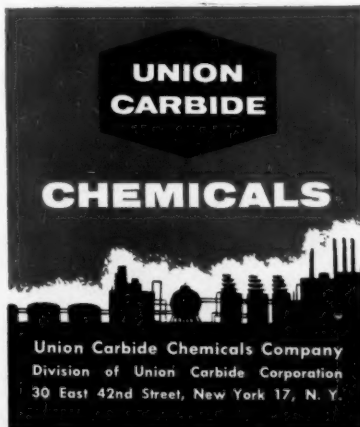
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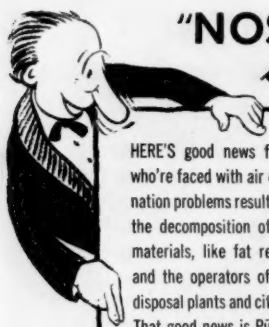
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## SPECIALTIES

arts, Schulsinger is consultant to such firms as Hallmark Greeting Card Co., Motorola, Westinghouse, and General Electric.

Once his products really catch hold—he vows—he's going to devote full time to research. Says Schulsinger, brimming with confidence, "There isn't anything—you name it—I want to do I can't do by just thinking about it hard enough."

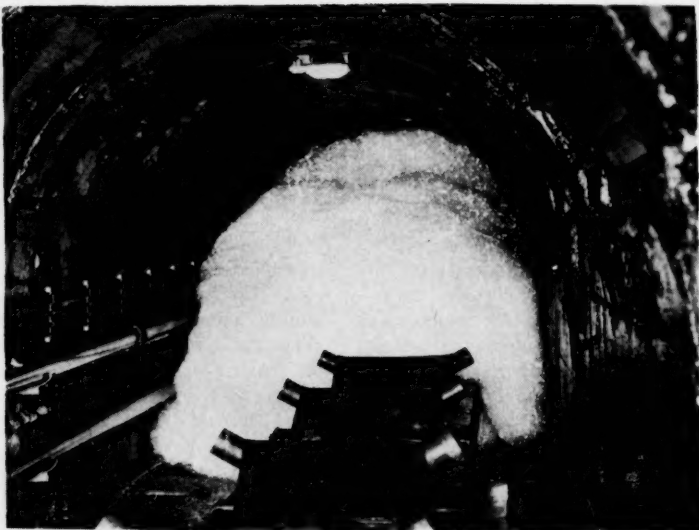
## PRODUCTS

**Weed Killer:** Allied Chemical & Dye (New York) has introduced a weed killer that's said to eradicate hard-to-kill Johnson, Bermuda and other weed grasses with a single application. It's hexachloracetone, sold under the tradename, HCA Weed Killers, for use on noncrop areas. Two forms are available: HCA concentrate, for dilution with oil; and a finished spray containing 2% HCA in an aromatic weed oil.

**All-Purpose Colorants:** Craftint Mfg. Co. (Cleveland) has developed what it calls a "truly 100% Universal Tinting Color" that blends with alkyd semigloss and flat, oleoresinous, latex, acrylic and PVAc bases. The colorants are sold either in one-shot tubes or in stand package forms, are available in 12 basic colors.

**Cotton Defoliant:** Virginia-Carolina Chemical (Richmond, Va.) has developed a new cotton defoliant, trade-named Folex. Active ingredient: merphos (tributyl phosphorothioate). Application rate: about 1 pt./acre, applied by ground or aerial spray equipment.


**Instant Wax:** Co-Wax, a wax that is said to form a carnauba-type water-wax emulsion on simple addition to hot water is the latest product of Concord Chemical Co. (Camden, N.J.). For floor wax makers, the company also has a companion product.



## Detergents Blanket Mine Fires

Synthetic detergents, already finding occasional use in fighting forest fires, have found a new job—fighting fires in coal mines. Here's the technique recently developed by the mines research branch of the British Ministry of Power: a foam of low specific gravity but high water retention is generated by spraying a mixture of water and

detergent onto a coarse net placed in the underground roadway on the windward side of the fire. Passing through the mesh of the net, the detergent produces a wall of lightweight foam, which is blown by wind along the roadway toward the fire. This wall of foam helps smother the fire by excluding air, dampening the area.



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## SPECIALTIES

Co-Wax Additive, which is added to the emulsion to give an antislip, self-polishing wax.

**Smash Hit:** Greene Metal Products Inc. (Chicago) is offering a mending material for pierced, cracked or shattered windows. The transparent patching material consists of 0.0015-in. Mylar with a pressure-sensitive backing. Two sizes are available: a roll 18x90 in. (\$4.95) and one 18x180 in. (\$8.50).

**Inhibited Pickle:** For metal-treating operations such as descaling and pickling. Armour and Co. has just developed a versatile corrosion inhibitor. The material is designed to prevent corrosion of metal being bathed in sulfuric, sulfamic and phosphoric acids. Laboratory tests show that mild steel in 15% sulfuric acid at 200 F has a corrosion rate over 2.5 lbs./sq. ft./day; the new inhibitor reportedly reduces this to 0.03 lbs./sq. ft./day. The product, a liquid, is called Inhibitor 2508.

**Fix Job:** Metro-Atlantic Inc. (Cen-terdale, R. I.) has developed a new resin-based, cationic, dye-fixing agent for direct colors. Called Atcofix #90, the product may be applied either by exhaustion or padding to produce an increase in the over-all wet fastness of many direct colors. It is compatible with all commonly used thermosetting resins. The product is said to produce a moderately firm hand in most fabrics.

**Green's for Stop:** Calgon Company (Pittsburgh) has recently introduced an all-purpose commercial cleaner that's a combination detergent and water conditioner. Called Pinnacle, the product was developed specially for manual cleaning operations in restaurants, food-processing plants and other institutions. When the dirt-saturation point is reached, the solution turns a dull green, signaling need for fresh solution.

**Multipurpose Greases:** Standard Oil Company (Indiana) has a new series of greases that incorporate a new organic thickener to produce a more stable product. Called Rykon, the line consists of four regular greases, three extreme-pressure grades.



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## Six major potash producers have quit the National Plant Food Institute

At issue are increased NPFI membership dues. Higher dues, voted in June, are slated to finance expanded promotional efforts to boost fertilizer usage.

Potash manufacturers contend that the new levies place an inequitable proportion of the burden on the potash industry. The dues, they say, don't reflect such items as their contributions to the American Potash Institute.

NPFI, on the other hand, says that the present method of calculating dues provides a fair apportionment among members.

A proposal that potash producers pay different dues and other similar proposals have been rejected.

But an NPFI committee will reassess the dues structure to determine if actual inequalities do exist.

## Feud Splits Fertilizer Ranks

Efforts to patch up the feud between potash producers and the National Plant Food Institute are under way this week in the wake of a walk-out staged by six companies. The six American Potash & Chemical Corp., Duval Sulphur & Potash Co., National Potash Co., Potash Company of America and the U.S. Potash Division of the U.S. Borax and Chemical Corp. Protesting sharply stepped-up dues, the companies have quit the NPFI. Now, in a move directly related to the resignations, NPFI has named a committee to evaluate its dues structure, check the validity of complaints.

The dispute is rooted in a new promotional drive planned by the institute. At its recent annual meeting, the membership voted to establish four regional offices, increase donations to educational institutions for research, launch—with the aid of

federal and state organizations—a big program of farm fertilizer demonstrations and to more fully publicize the results of research and demonstration projects. To finance this program, membership dues were increased. Primary producers will pay up to 0.2% of sales.

New assessment schedules, potash producers assert, are unfair. Their reasons:

- The higher dues take no account of the promotional activities of the American Potash Institute. Its programs are supported by contributions from potash companies that amount to 1-2% of annual sales. In the '56-'57 season, API's budget reportedly amounted to \$611,000, that of the NPFI, \$530,845. Since the API pushes balanced or mixed fertilizers, it helps all fertilizer producers, say potash company spokesmen. And API's efforts are very similar to those pro-

posed for the NPFI. Hence, potash manufacturers claim that they would be paying twice for the same services.

- Captive production is ignored in calculating membership fees. Potash firms claim that virtually all of their production is sold directly, but that sizable portions of nitrogen and phosphate output are employed captively.

- Financial burden is placed only on primary plant food producers. As a result, fertilizer mixers will pay what they've paid before, yet enjoy the benefits of the new NPFI drive.

- NPFI's budget allotment for potash is out of line with dues collected from potash firms. In the 1956-'57 budget, less than 7% of the total budget went for potash products. If the same ratio applies to the new budgets, potash companies' dues would probably outstrip the amount spent on potash materials.

**More Than Dues?** Although the dues issue is undoubtedly the major reason behind the withdrawal, a CW check of potash producers and trade associations turned up other factors that may be operating to a limited degree.

Personality clashes, said one company spokesman, may have had an influence on the decision to withdraw. And, some feeling exists that the NPFI is "nitrogen dominated" and that in the past, its programs have benefited nitrogen and phosphate producers more than potash-product makers.

There's fear, too, in some potash circles, that NPFI's new program would push direct application of materials (anhydrous ammonia, for example) and that research schedules might stress the role of nitrogen and phosphates in soil fertility. If the latter occurred, potash firms might well fall behind in the race to acquire product end-use know-how, and potash usage might tend to become fixed at present levels while other soil nutrients continued to gain.

Others, however, dispute those contentions, say that NPFI has been impartial in its programming of promotion and research.

**Repair Call:** At NPFI, officials are naturally hopeful that the breach can be mended. Although it believes that present dues are equitable, the organ-

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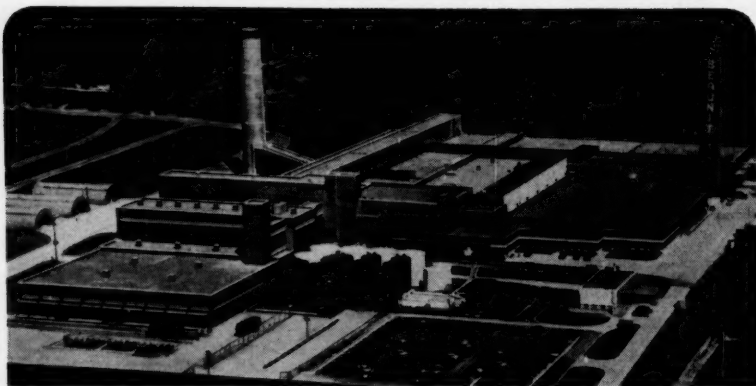
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## SALES

ization has appointed a five-man committee to thoroughly study the dues structure. Its findings, however, won't be ready until October.

NPFI has turned down alternative proposals advanced by the potash producers—to establish special classes of membership or accept dues payments double the old rate. (New schedules would at first triple and eventually quintuple potash producer payments). Grounds: a precedent might be set that would lead to further requests for special consideration; such action would be "unfair" to other NPFI members.

Although it seeks a meeting of minds, NPFI isn't worried about the impact of the potash producers' withdrawal on its new plans. The drive will go forward as scheduled, dues for the remaining members will not again be raised to make up the loss caused by the resignations.

Potash companies are also anxious to resolve the differing viewpoints. If the NPFI can come up with a dues system that they consider "equitable," they will re-apply for NPFI membership. Generally, the companies are in sympathy with the objectives of the institute, feel its services are valuable. The dispute is perhaps as much a matter of principle as it is the actual sums involved. Meanwhile, both sides will go their separate ways. There'll be no letup in either's drive to boost fertilizer usage.

## DATA DIGEST

• **Phenolic antioxidants:** Analytical procedures for butylated hydroxyanisole and hydroxytoluene and propyl gallate used in foods, feeds and packaging materials are explained in new 16-p. brochure. Eastman Chemical Products, Inc. (New York).

• **Sodium dispersions:** Expanded and revised edition covers reactions that utilize sodium dispersions, design and operating instructions for equipment, procedures for typical reactions and equipment layout for continuous preparation of dispersions. U.S. Industrial Chemicals Co. (New York).

• **Urethane:** Principal chemical reactions with acids, alkalis, halogens, sodium and organic chemicals are briefly outlined in new technical bulletin. Uses suggested in plastics, textile finishing, intermediate manufac-





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ture, medicine, non-luminous heating candles, food flavoring and in producing solid solutions. Bibliography included. Organic Chemicals Division, Food Machinery and Chemical Corp. (New York).

• **Lithium hydride:** Uses as a source of hydrogen, reducing and condensing agent, catalyst and drying agent are described in 4-p. bulletin. Physical properties, specifications and thermodynamic properties are also given. Foote Mineral Co. (Philadelphia).

• **Polyvinyl acetate emulsions:** New manual furnishes comprehensive data on physical properties of Gelva KR emulsions, describes compounding and applications for textiles. Shawinigan Resins Corp. (Springfield, Mass.).

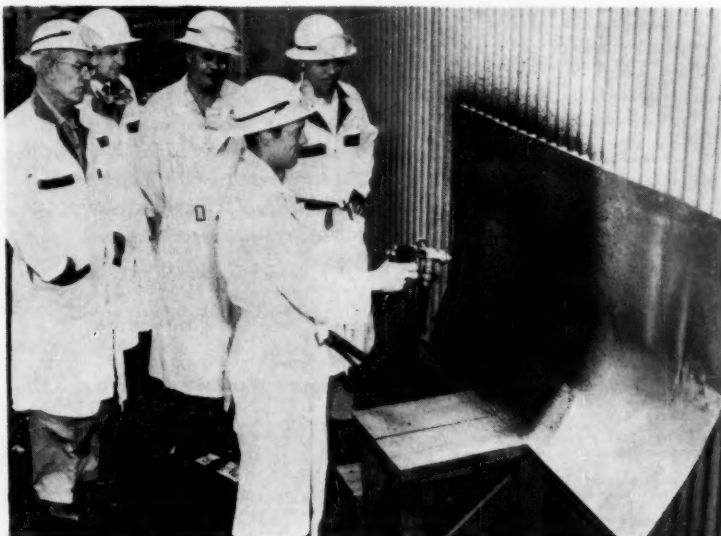
• **Precipitated calcium carbonate:** Bulletin gives specifications of different grades of carbonate, describes use as inert filler for polyvinylchloride applications. Detailed technical data, as well as formulation examples, are included. Another bulletin explains use

of material to give low sheen alkyd wall paints. Diamond Alkali Co. (Cleveland).

• **Thiosemicarbazide:** Typical reactions illustrating behavior as a mono-acid base and a strong reducing agent comprise major part of 4-p. data sheet. References, toxicological and physical properties are supplied. Industrial Chemicals Division, Olin-Mathieson Chemical Corp.

• **Cyclohexane:** Data sheet SD-68 gives properties and information necessary for safe handling and storage of cyclohexane. Manufacturing Chemists' Assn. (Washington, D.C.).

• **Rubbers:** New brochure describes hot, cold, and oil-extended cold types of rubbers that are butadiene-styrene copolymers. Detailed compounding information for light colored materials, tires, sponge, camelback and floor tile are offered. Similar data and formulations for oil resistant, special-purpose and butyl rubbers, as well as latices, are presented. Polymer Corporation Ltd. (Sarnia, Ont.).



## Know-how Forges the Dealer Team

Training in protective-coating application techniques pays off three ways for Pittsburgh Coke & Chemical. It familiarizes dealers with the company's coal-tar coatings promotes higher sales, and better supplier relations. Pittsburgh Coke & Chemical dealers have just finished a 3-day course at the firm's Neville

Island plant. Under the guiding eye of company sales and technical-department staffers (above), dealers learn how coal tar-based coatings are applied to combat industrial corrosion. Distributor development programs, as many a chemical company finds (CW, April 21, 1956, p. 72), are a potent sales tonic.

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